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THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

Vol. XXXIII. No. 840.] LONDON, JUNE 17, 1879. [31st Year.] Price 6d.

GAS PURIFICATION
BY
OXIDE OF IRON.

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CENTRAL DEPÔTS:
CO. DONEGAL, IRELAND;
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And SPECIAL GASOMETER PAINT.
Several Prize Medals. Established over 20 Years.
These Paints are now used in over 200 Country Gas-Works, and by all the London Gas Companies, on Gas-holders, Scrubbers, Purifiers, &c. Also used by the Admiralty, War Office, Railway Companies, Founders, &c. They prevent and arrest rust, and protect iron from the action of water, sulphurous and gaseous exhalations; do not crack, blister, or flake off; will cover tar effectually.
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THE
"OTTO" GAS-ENGINE.

See Page 922.

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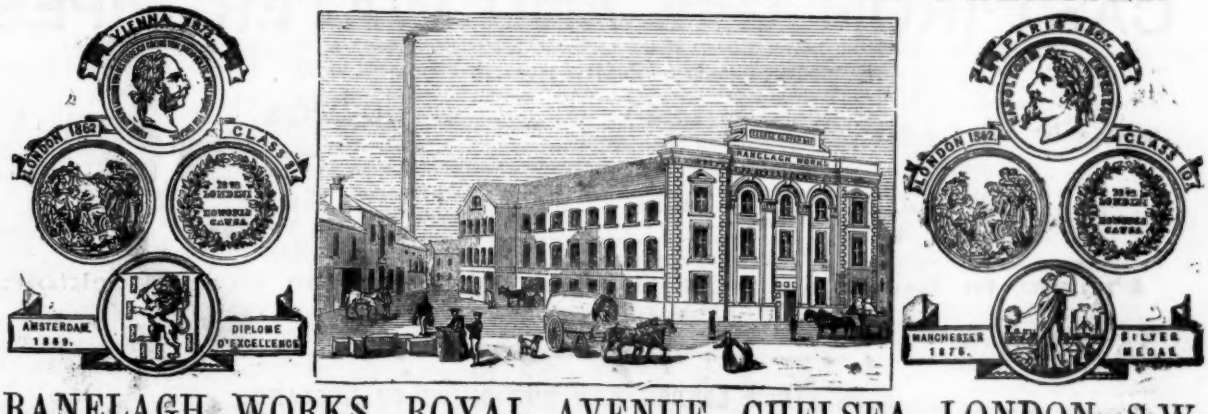

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IMPROVED CONSUMERS WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

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And all kinds of Experimental Gas Apparatus.

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SIZES: ¾ to 12 inches at GLASGOW.

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Effecting a great saving in the cost of discharging Coals from Vessels, Barges, &c. Several of these Cranes, with the necessary power, are now being erected at Beckton, Hull, and other Gas-Works.

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Sixteen recently erected at Beckton, applied to Covers 30 feet square.

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IN SUCCESSFUL OPERATION AT THE NEW WORKS OF THE NEWCASTLE AND GATESHEAD GAS COMPANY, AND IN COURSE OF ERECTION AT THE CARLISLE CORPORATION GAS-WORKS.

Special "REGULUS COCKS" manufactured to stand Acid.

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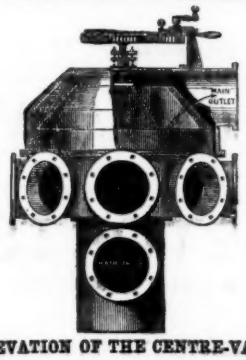
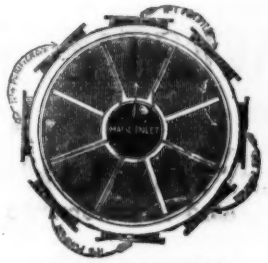


ELEVATION OF THE CENTRE-VALVE.

C. & W. WALKERS'
PATENT CENTRE-VALVES.

PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

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They beg special attention to the excellence and superiority of their WET and DRY METERS, several thousand being now in use by many of the largest Gas Companies in the West of England and South Wales. Warranted to measure correctly, and not to vary. Their acknowledged superiority has brought them into general use more rapidly than any Meters hitherto manufactured. A guarantee of Five years tendered with each Meter.

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And every description of Gas Machinery.

TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

WEST'S GAS IMPROVEMENT COMPANY,

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ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,

And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

The advantages attending its use are—

INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

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MANUFACTURERS OF ALL DESCRIPTIONS OF

APPARATUS CONNECTED WITH GAS-WORKS.

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FOR PURIFIERS, GASHOLDERS, BYE-PASS, AND OTHER ARRANGEMENTS REQUIRING VALVES IN GAS-WORKS.

The Faced Valves, as made by the Patentees, continue to give great satisfaction, and they are being used extensively by many of the best gas engineers of the day.

They are more easily repaired than any other kind of Valve in use, and can be re-ground in a few hours without removal, and made perfectly gas-tight.

References can be given to many Engineers of high standing, who will testify as to the favour in which they are held.

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And every Description of Gas Apparatus.

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ROUND STATION-METERS,

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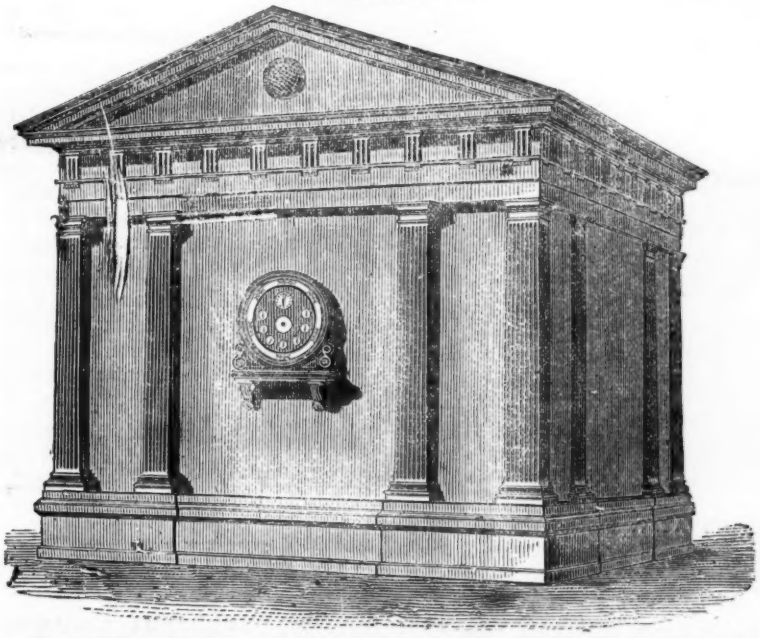

SQUARE STATION-METERS,

WITH PLANED JOINTS.

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GAS COOKING APPARATUS.

Home and Foreign Orders promptly attended to.

All Sizes of CONSUMERS METERS, STATION-METERS, and GOVERNORS generally in Stock.

Orders almost invariably despatched on the day of receipt,

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WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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DONNINGTON, NEAR NEWPORT, SHROPSHIRE.
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ESTABLISHED IN 1860.

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Unequalled for the purposes of Mine Owners, Chemical Manufacturers, Cement Manufacturers, and others.

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PORTABLE PIPE SCREWING

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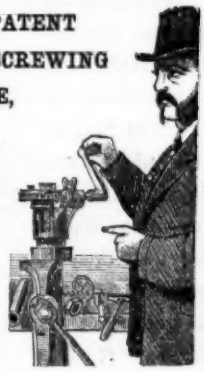

For 1 in., 1¼ in., 1½ in., and 2 in. Gas Threads, complete £7 10s.

In use at the chief gas-works, and giving great satisfaction.

For other useful goods, see Bailey's "Illustrated Inventions," post free 3s. 6d.; gratis to ledger customers.

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Brassfounders, Gauge Injector and Tool Makers,

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Gold Medal Awarded, Paris Exhibition, 1878.

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STEEL OF ALL DESCRIPTIONS,

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The following Medals have been awarded:—

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The only Gold Medal awarded for "Apparatus and Processes for Heating and Lighting" by the Imperial Commissioners

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The following Medals were also awarded at Paris, 1878:—

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BRACKETS FOR HEATING AND LIGHTING;

METALLIC BEDSTEADS.

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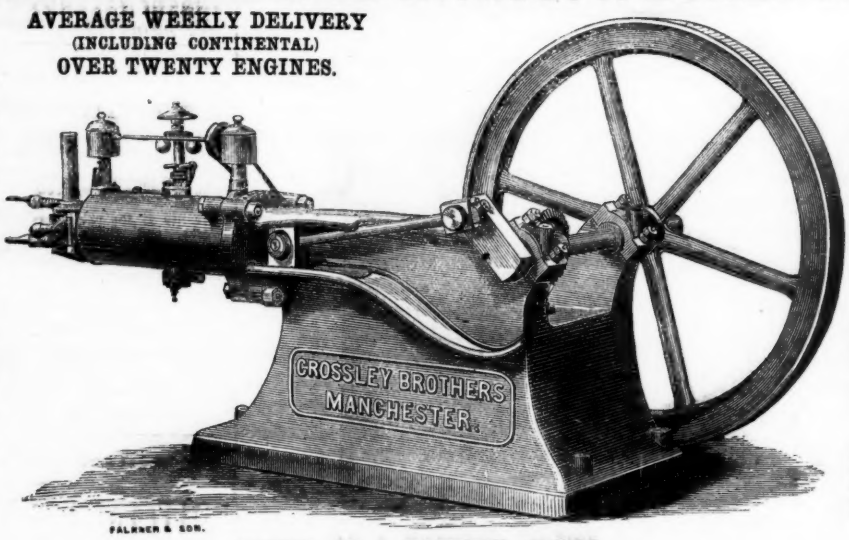
AN ENGINE WHICH WORKS WITHOUT A BOILER OR STEAM

AVERAGE WEEKLY DELIVERY
(INCLUDING CONTINENTAL)
OVER TWENTY ENGINES.

The durability of these Engines is now established by experience, one of them having run night and day at the Hinckley Gas-Works for over Twelve months without any expenditure for repair; this being equal to about 2½ years average work.



Over 1900 already delivered.

Very numerous Testimonials from Users, including Engineers, Men of Science, and others, on application to the makers.

No trouble with Coal, Ashes, Smoke, Insurance, Water, or constant attendance.

No Glands to pack, or Water Gauges and Steam Gauges to watch.

STARTS AT A MOMENT'S NOTICE.

THE "OTTO" SILENT GAS-ENGINE.

(Otto and Crossley's Patents, 1876 and 1877,)

THEY ARE USED FOR ALL KINDS OF PURPOSES, CHIEFLY FOR EXHAUSTERS, SCRUBBERS, & PUMPS.

DELIVERED IN MANCHESTER.	SIZES									OFFERED.	CASES NOT CHARGED IF RETURNED FREE
	NOMINAL HORSE POWER	½	1	2	3½	6	8	12	16		
	MAXIMUM HORSE POWER	¾	1½	2½	4	9	12	18	24		

PRICES INCLUDE CAST-IRON STAND, TURNED FLY-WHEEL, AND DRIVING PULLEY; WATER-VESSEL, SEVERAL DUPLICATES, AND GAS-FITTINGS (EXCEPTING METER AND PIPES).

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CROSSLEY BROTHERS, MANCHESTER.

LONDON HOUSE: 116, Queen Victoria St., E.C.

TANGYE BROTHERS AND HOLMAN,

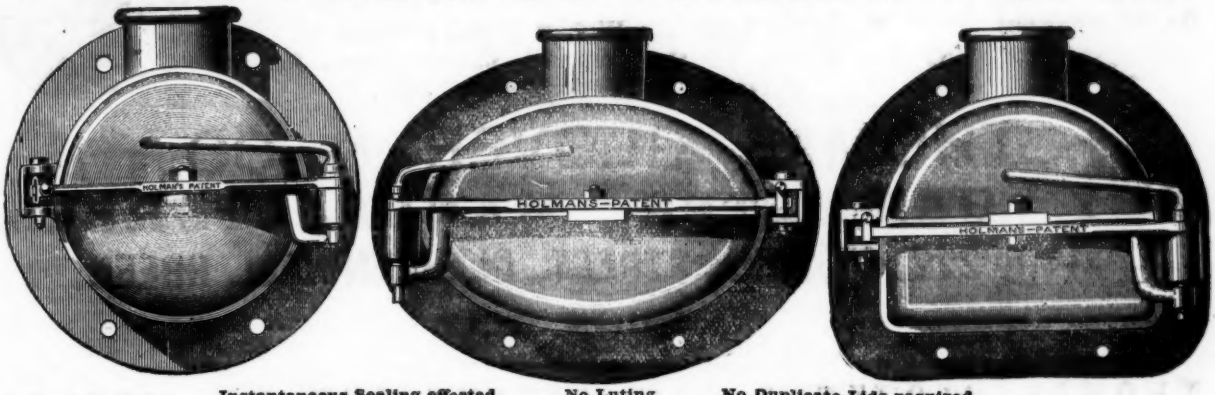
CORNWALL HOUSE, 35, QUEEN VICTORIA STREET, LONDON, E.C.,

(LATE OF 10, LAURENCE POUNTNEY LANE.)

SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS.

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and New Self-Adjusting Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.

Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

Since their introduction in 1869, these Patent Retort-Lids have been thoroughly itested, being now in use in nearly all the principal Gas-Works in London and the Provnces.

T. B. and H. are now making the "Morton's Self-Sealing Lid" of the SAME FORM OR SECTION AS THE RETORT (see Illustrations above), as well as bringing the Mouthpiece from the D or Oval at back to Circular in front, as heretofore.

D and Oval Morton's Lids are working satisfactorily both in this country, on the Continent, and in the United States of America. Among others they have been adopted by the following Gas-Works:—

The Gaslight Company's Works, Fulham; Ditto, Bromley-by-Bow; Ditto, King's Cross; Ditto, Shoreditch.
And also in the Gas-Works at Richmond, Maidstone, Gloucester, Glasgow, Portsea, Roubaix (France), The Hague (Holland

HUNT'S PATENT EQUILIBRIUM GAS-GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.

The principal advantages of this arrangement over the ordinary form of Governor are as follows:—

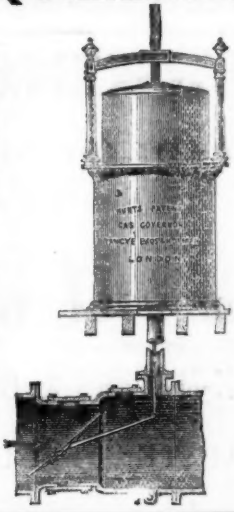
Its sensitive action prevents oscillation.

It is self-adjusting—*i.e.*, it maintains a steady pressure under variations of inlet pressure or a fluctuating consumption.

The inlet to Gasholder being contracted to the smallest possible dimensions, all danger from leakage through insufficiency of seal, tilting, &c., is entirely avoided.

The valve portion being separate from the holder, it can be handled and fixed like an ordinary Slide-Valve direct in the main; and the holder can be placed at an convenient distance immediately above it. The cost is thus materially reduced, and the inconvenience of heavy lifts done away with.

There are no working parts likely to get out of order.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight and Coke Co. (9), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

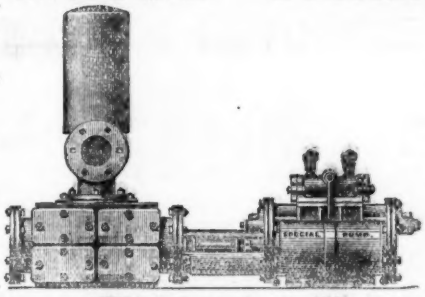
Yours truly,

(Signed) JOHN JOHNSON.

PRICES AND FULL PARTICULARS ON APPLICATION.

THE "SPECIAL" STEAM-PUMP.

Diameter of Steam Cylinder.	Diameter of Water Cylinder.	Length of Stroke.	Gallons of Water per Hour, Approximate.	Reduced Prices.
3	1½	9	450	£16
4	2	9	815	18
5*	2½	12	1,250*	20
5*	3	12	1,830*	22 10
4	4	12	3,250	25
6*	4	12	3,250*	30
5	5	12	5,070	32 10
7*	5	12	5,070*	40
6	6	12	7,330	40
8*	6	12	7,350*	50
7	7	12	9,750	50
10*	7	12	9,750*	65



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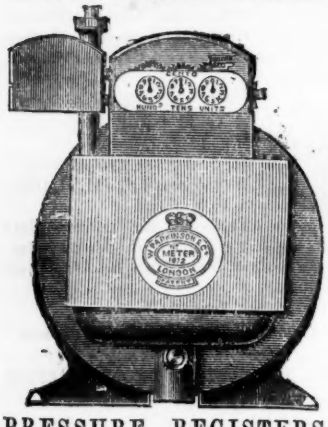

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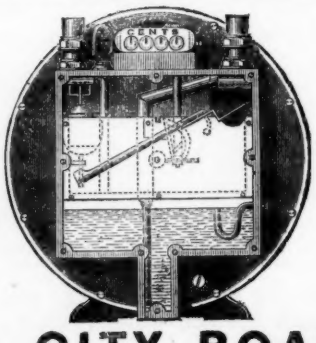

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TO CORRESPONDENTS.

H.—*The last list on the subject we published was in the* JOURNAL *for Feb.* 3, 1874; *but we should add that in the majority of cases the prices given have been largely reduced. How to put pressure on Gas Companies to reduce their charges depends upon circumstances. As a rule, they do not require pressure to be put upon them for the purpose; they conduct their business on the same principles as other manufacturing concerns, and sell at the lowest price consistent with a due regard to their interests.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JUNE 17, 1879.

Circular to Gas Companies.

THE British Association of Gas Managers, we are happy to say, have had a very successful meeting in Newcastle. The attendance of members was large, and many additions were made to the roll of the society. Allowing for a loss of ten by death and withdrawal, at the end of last year the number of members stood at 656; but at the meeting just held, an addition was made of thirty-one Ordinary, and seven Extra-ordinary Members, which brings up the total number in the present year to 694. The truth is that the Association is fast becoming a powerful body, which ought to exercise an important influence upon the progress of gas industry. It may be that the members scarcely feel the strength they might wield, if they could occupy an independent position; but, as a matter of fact, although directing the affairs of gas undertakings, they are really under the control of others, uninstructed in the art of gas-making, who look simply to financial matters, and this greatly hampers a gas manager in many of his efforts to improve the working of his undertaking.

But to return. The proceedings were, as usual, opened by the delivery of the Inaugural Address of the President, who, on this occasion, was Mr. W. J. Warner, C.E., of South Shields. The President, of course, commenced his Address by thanking the members for the honour they had done him, in electing him President—an honour which he well deserved, for he was one of the originators of the Association. He then proceeded to detail the present numerical condition of the Association, and after paying a graceful tribute to the memory of deceased members and friends of the Association, passed on to give a short review of its early history, in which, as intimated above, he was an actor. We miss here something that might have been said, but we may pass that over. At the present time Mr. Warner thinks the constitution of the Association requires some extension. He wishes to see its basis enlarged. There is now but one class allied with it. These are Members—Ordinary, Extra-ordinary, and Honorary. Mr. Warner sees clearly that, with a view to interest those who will at some future time become gas managers, it would be advisable to enlist them into the ranks of the Association, and therefore he proposes to form a new grade, to be called Associates; but, so far as his statement goes, we think he limits too narrowly the admission to this class. Pupils he would admit, apparently without hesitation; but we are looking to intelligent and well-conducted foremen, upon whom so much depends in the management of gas-works. These should be encouraged, by every possible means, to enlarge their knowledge, and we do not know how they could do it better than by becoming connected with the Association. The subscription required of them might be small—merely sufficient to cover the cost of the annual report, with a fair contribution towards the general expenses. We hope Mr. Warner's proposition will be seriously taken up, and that before the next meeting a definite proposal will be laid before the members.

Mr. Warner subsequently lamented that a strong combination does not exist among Gas Companies, for the defence of their interests. That such a want should be felt is simply the fault of the Companies themselves. The Gas and Water Companies Association may not be all that could be desired; but whenever they fail, it is, we repeat, entirely the fault of the Companies, whose interests are watched over with the most zealous care by the energetic Secretary of the Companies Association, who is, we believe, left almost entirely to look after its affairs. A stronger combination, as Mr. Warner proposes, is undoubtedly desirable, but it can only be effected by the more hearty co-operation of the Companies themselves. We shall not refer here to what Mr. Warner says with regard to the interests of Gas Companies in relation to the electric light, as this matter will be alluded to hereafter. The future education of the gas manager naturally had a share of Mr. Warner's attention, and we think it has not received all the consideration it deserves at the hands of the Association. If our profession is to be raised in its status, we may say without offence that the intellectual condition of those who enter it must be elevated; but how this is to be done it is not for us to say. The President alluded to one matter of great importance to Gas Companies who work up their own residuals. A Bill has been introduced into the House of Commons, by the Local Government Board, which will render all works intended for the manufacture of sulphate or muriate of ammonia, for the distillation of tar, and gas liquor works, liable to rigid official supervision. There is happily no difficulty in managing ammonia works so that they shall not be a public offence; therefore, we do not think that Gas Companies who manufacture ammoniacal salts will be very much troubled by inspectors.

As a matter of course, we cannot follow Mr. Warner closely through the whole of his Address; but we must not finish our notice without a reference to his remarks on the utilization of gas for cooking and heating purposes. In the extended use of gas for these purposes lies the profitable future of Gas Companies. In promoting this extended use, Mr. Warner has had a large share, and the thanks of all Gas Companies are due to him for the efforts he has made.

Leaving Mr. Warner's Address, we may return to the general results of the meeting, which was of the most enjoyable character. The festivities, including the dinner of the Association, were duly appreciated. The visit to Alnwick Castle was only marred by the unpropitious weather, which prevented the members from wandering over the beautiful grounds and gardens. The interior of the castle, which was opened to the members by the liberality of His Grace the Duke of Northumberland, with its interesting interior and valuable contents, was a sight which must have much gratified the members. The banquet which followed the visit was provided by the profuse, but not ostentatious liberality of the North of England Gas Managers Association, and the proceedings were greatly enjoyed by all those who were present. On the following day, still by the kindly hospitality of the Northern District Association, the members and friends were taken by steamer to view the hydraulic machinery at the Tyne Swing Bridge, and Sir William Armstrong's works at Elswick. They also visited the Redheugh and Elswick works of the Newcastle and Gateshead Gas Company. At all these places, it is needless to say, they were extremely well received, and derived much gratification and instruction from what they saw. After these visits the Company returned

to the steamboat, and went down to Tynemouth, where they were again sumptuously entertained in the splendid Aquarium of that place.

Perhaps no meeting of the Association has afforded more pleasure to the members than this at Newcastle, the recollections of which will long remain in the memories of all who shared in its proceedings. Before concluding our notice of the general meeting, we may mention that the Association did Mr. George Livesey the honour of electing him an Honorary Member, in recognition of the eminent services he has rendered to Gas Companies. This honour was well merited, and the Association did themselves credit by recognizing Mr. Livesey's position in the gas world.

The Select Committee on Lighting by Electricity finished their sittings on Friday last, when, after a short examination of Lieut.-Col. Haywood, C.E., the Committee proceeded to discuss a draft report which had been prepared. We are not able at present to give the full text of this report, but we may here indicate what appear to be its chief points. It sets out that, by a general consensus of opinion among the scientific witnesses, electricity is destined to play a great part, not simply in furnishing illumination, but in the development of motive force. With this latter part of the matter we have, happily, nothing to do. Electricity will, no doubt, be used, in some sort, for illuminating purposes, long before it drives a spindle. For lighthouses it is specially applicable, and it may be used, as we understand the report says, successfully for the illumination of symmetrical spaces of wide area, and for large interiors; but there is at present nothing to show that it can invade the domestic hearth. Here gas will remain supreme for many a long year. If any one is desirous of lighting his shop with electricity, he can do so, and no legislative interference is necessary. If, indeed, it be found possible to illuminate all the rooms in a house, the proprietor may do so without restriction. So far, then, legislation is perfectly unnecessary. The Committee seem to think that Corporations and Local Authorities should have power to break up the streets for the purpose of laying cables for transmitting electricity for illuminating purposes, but this right they would deny to Gas Companies. The belief appears to be that Gas Companies, interested in a rival industry, would obstruct rather than promote electrical science. The idea is most absurd. Gas Companies wish to make money, and it would little matter to them whether they made it by supplying electricity or by distributing gas. If they saw their way clear to make a good profit by the supplying of electricity, no body of men would go more earnestly into the business than the Directors of Gas Companies. In face, however, of the recommendations of this report, we could not advise Gas Companies to apply for any parliamentary sanction for the exercise of such powers. To Municipal Corporations and Local Authorities the Committee would give ample powers to experiment themselves, and allow private individuals to do likewise. At the same time, it is freely admitted that the system of electric lighting is not sufficiently developed to require any legislation at all. It seems to be supposed that the supply of gas to engines for the production of motive power will amply compensate Gas Companies for any loss they may sustain by the use of electricity for external illumination; but it must here be mentioned that it has recently been discovered that circuits of great lengths—two and two and a half miles—may now be used, the force from which must be generated by engines of far greater power than can be obtained by the use of gas. As Dr. Lyon Playfair put it, a central station at Charing Cross might be able to transmit electricity to illuminate Paddington Railway Station. We shall wait with perfect equanimity the result of an experiment destined to effect this object. If any one wishes to see the difficulties which stand in the way of its success, they have only to refer to Sir William Thomson's evidence, which was published in our last issue. We cannot at present allude to the report at greater length. When it is a public document we shall print it *in extenso*, and make some further comments. We may, however, be excused for remarking that the evidence of all witnesses who appeared to be in favour of Gas Companies was not well received by the Chairman; but it does not matter. Electricity must take its chance, and Gas Companies may be very well content to follow their own course, heedless of the presence of the electric light in their midst. We have some fear that the publication of the report may have a prejudicial effect on the value of gas property. There are silly people whose minds are swayed by every breath of air; but we sincerely hope that very few, if any, will be induced to part with their shares on the strength of the opinions of this Committee.

The amalgamation of the South Metropolitan and the Surrey Consumers Gas Companies has not yet, we believe, received the sanction of the Board of Trade; but no serious obstacle can possibly stand in the way of the completion of so just and reasonable a scheme. The opposition which has been raised has not proceeded from anybody fairly entitled to be heard against it, and the Board of Trade will, we feel assured, consider first that a case has been made out for amalgamation, and next that the scheme propounded is admirably adapted to conduce to the interests of the public and both the Companies concerned.

We learn that the Gas Committee of the Manchester Corporation, since their recent visit to Maidstone, have resolved on introducing West's system of drawing and charging retorts into one of their large houses, containing 280 retorts. The South Metropolitan Company have also resolved to adopt the system. It is curious to remark that while complex plans and heavy apparatus have almost completely failed, the simple apparatus and plan in use at Maidstone seem to have solved the problem of mechanical, or, at all events, partially mechanical stoking.

The electric light has received a novel application in Paris. It is now employed to light the Salon, or Exhibition of Modern Pictures. According to the reports of art critics and newspaper correspondents, it is by no means a success. This may be caused, perhaps, to some extent, by the arrangement of the lights. They are suspended from the roof, and hang not far from the pictures. Behind each globe is a large reflector, intended to concentrate the light upon the walls and pictures. It seems to effect this too thoroughly, for, unless the visitor stands immediately before a single picture, he cannot obtain a good view of it. If he stands at an angle, all the other pictures are said to be blurred out of recognition. The painter's work is but too distinctly seen, for every stroke of the brush appears to be revealed. Nor is the light so effective in the display of colours as we should have imagined. Some are improved, but others, and particularly greens, suffer. The illumination of the gardens and sculpture hall is reported as being a greater failure. There appears to be too much glare for the effective display of statuary, while in the gardens the numerous lights are said to "kill one another." This display will constitute a lesson for the directors of our picture galleries at home, and perhaps they will think twice before they substitute the electric light for gas. We should mention that more than 200 lights were employed, and that the dynamo-electric machines used were actuated by one engine of 300-horse power. The lamps, we read, are furnished with eight Jablochkoff candles, each of which burns for one hour. They are said to cost a franc apiece, so the light cannot be regarded as an economical one.

The Town Council of Cardiff have been exercised on the question of gas-testing. They have their own Examiner, and a testing-place at the Town Hall. The Cardiff Gas Act, however, we believe, prescribes that, for legal purposes, the gas must be tested at the works after three hours previous notice. But the great contention is about the burner to be used. The Gas Act prescribes a fifteen-hole Argand with a seven-inch chimney, and this burner appears to be employed by the Corporation Tester. But the Company have introduced at the works, as they have a perfect right to do, a fifteen-hole Sugg's "London" Argand burner; hence differences in the results obtained at the two different testing-stations. The Company are inclined to believe that the low results obtained at the Town Hall are ascribable to defects in the testing apparatus, and they wish one of their officers to examine the apparatus—a request which the Corporation ought at once to grant. These paltry disputes are exceedingly contemptible, and ought to be easily arranged. We know that Corporations are very unwilling to be on good terms with Gas Companies, but they effect no useful purpose by indulging in incessant squabbles.

Lieut.-Col. Haywood has presented a report to the Commissioners of Sewers of the City of London, on the large gas-lamps now in use in Queen Victoria Street, City. He sets out clearly the cost of the fifty-five lamps supplied with five-feet bat's-wing burners, and the light they yield. He goes on to give the cost of the new lights, and the illumination obtained from them. It results from his calculations that the thirty-five new lamps cost nearly three times as much as the fifty-five they have superseded. At the same time he estimates that the improved lamps give four-and-a-half times more illumination. We are very much afraid that the enhanced cost of the new lights will effectually stand in the way of their adoption. Great as is the need for more light in our thoroughfares, people will look at the charge for it. The ratepayers interests, they will say, must be considered.

Wells (Somerset) Water Company.—At a meeting of this Company last Friday, Mr. Edward Padfield, Secretary and Manager of the Wells Gaslight and Coke Company, was unanimously appointed Manager of the water-works.

Water and Sanitary Notes.

Sir J. M'Garel Hogg has brought in the Bill of Indemnity which is to enable the Metropolitan Board of Works to defray the expenses incurred in promoting the two Water Bills of last session. It stands for second reading to-night, and may perhaps make some progress. There would appear to be very little opposition to it, for the Vestries have not come forward, recognizing, perhaps, that their opposition was likely to prove fruitless. We have looked carefully into the Bill, in order to make sure that words were not slyly introduced which would give the Board power to repeat the offence which the present measure condones. We may, however, state that the Bill appears to be honestly drawn, simply with reference to the expenses incurred last year. The preamble is somewhat amusing, by the reiterated assertion that all that was done was intended "to preserve and improve "the health of the Metropolis." We dare say it was so intended; but, at the same time, if the Board had succeeded, the consequence would have been an enormous addition to the debt of the Metropolis, while the public health would have remained the same. The Indemnity Bill will, no doubt, pass; and, as it stands, it looks very much like the verdict of the Welsh jury: "Not guilty; but don't do it again."

Ratepayers within the district of the Thames Valley Main Sewerage Board have been mulcted in costs to the extent of £6730 in connection with the Bill promoted to enable the Board to carry out the scheme of Lieut.-Col. Haywood. The Bill, it will be remembered, was thrown out on second reading, and is not likely to be re-introduced. We here express no opinion on its merits, but we think, in all fairness, it should have been allowed to go before a Select Committee. Sir Joseph Bazalgette has once more come to the front with the scheme proposed in conjunction with that of Messrs. Law and Chatterton, for joining the Thames Valley system with the West Kent drainage. It appears that arrangements have been made, in virtue of which the West Kent Board are to provide and maintain an outfall for the Thames Valley sewage at Croydon, in consideration of being paid a fixed sum per annum. From this point, sewage will pass on to join the West Kent system. Supposing this plan to be adopted, "the two Boards will remain perfectly distinct, "and continue as independent as they now are as regards the "conduct and maintenance of their own works." Whether this scheme will ever be carried out, of course, is doubtful; but the choice seems to lie between the Molesey scheme and the one propounded by Sir J. Bazalgette and his colleagues. The opposition to the former will, we expect, grow in strength every year, and some alternative plan for the disposal of the Lower Thames Valley sewage must be proposed. Whether the one we now notice will be successful, it is impossible to say; but we cannot help thinking that it stands a fair chance.

We publish in another column a full report of the proceedings at the half-yearly meeting of the Southwark and Vauxhall Water Company. It is not to be wondered at that the Chairman's speech should be almost entirely of a congratulatory character. The steady progress which the Company have made, during the last three years, towards returning prosperity, was a theme which could not be resisted. How the Company fell into so low estate very few know, and Alderman Knight affords us no explanations. We confess to not quite understanding the allusions made to Mr. Whiting, whose efforts to retrieve the circumstances of the Company were incessant, and in the end, we may say, crowned with success. This gentleman, no doubt, acted under the best advice he could obtain, and applied it with a judgment gained by long experience. The result of his exertions is that the Shareholders will this half year receive a five per cent. dividend. There are some things not touched upon by the Chairman, of which we should have been glad to receive information. What, for the sake of example, is being done with the Nunhead reservoir? A very dry, hot autumn is prophesied, and how will Bermondsey be off for water, supposing that the reservoir is not filled? However, we are perfectly content with past results, and the somewhat boastful promises of the Chairman. He announces the intention of the Directors to supply the best water in the Metropolis, and to suply it at the lowest charge, and ultimately to pay a better dividend than that paid by any other Metropolitan Water Company. We shall be very glad to see all these promises realized. The Company have at their command the best source of water in the kingdom; but it requires careful treatment to satisfy exacting sanitarians. With ample depositing-tanks and efficient filter-beds, Thames water is calculated to satisfy every consumer and even so *exigéant* an analyst as Dr. Frankland.

Having already referred to the Lower Thames Valley Main Sewerage scheme, which proposed to make an enormous sewage farm of 900 acres close to the Thames, and within a short distance of the intake of the Southwark and Vauxhall Company, we may express an opinion that the Water Companies were perfectly right in opposing the scheme, and especially those whose works were on the same side of the river as the projected farm. It stands to reason that a large amount of soakage would have taken place, and, without an intimate knowledge of the nature of the ground, it would be impossible to say where the soakage would have gone. Much of it would, no doubt, have found its way into the river, and must there have had a prejudicial effect. The Molesey scheme is, as we think, hopelessly defeated, and is not likely to be revived; so the Southwark and Vauxhall Company may go on improving their works to purify Thames water as it is, and presently supply the best water in all London.

Alderman Knight, however, must look out. Cardinal Manning has an eye on the Water Companies, and intends to see that the best water is supplied. The teetotal Cardinal has enlisted a band of temperance societies, who have, in the first place, memorialized the Government on behalf of the working classes, for the purpose of inducing the former to adopt some legislative measure to remedy the evils and dangers complained of. Nobody seems to know what these evils and dangers complained of are. It is a settled opinion among enthusiastic teetotalers, that working men drink beer and gin because they cannot get palatable water. The idea is very absurd, for in towns where water is supplied which some esteem of better quality than that consumed in London, drunkenness is much more common than in this Metropolis. We believe it is a fact that in London inebriety and crime are on the decrease, notwithstanding the condition of the water supplied.

If the Vyrnwy scheme should eventually be adopted by Liverpool, Birkenhead is anxious to share in the supply. If the proposal of the Birkenhead Commissioners be accepted, it will ease Liverpool of some of the expenses of carrying out the scheme, should parliamentary power be granted. Birkenhead is in somewhat urgent need of additional sources, the present being somewhat inadequate for the effective supply of the town and district. It is to be regretted that the Liverpool Water Committee do not more promptly decide on the scheme they will promote. Many engineers are on the tiptoe of expectation, and anxious to learn the final decision. It must be given before November, so we may wait with patience for a few months.

Some rather extraordinary statements were made at a recent meeting of the Colchester Town Council, as to the means projected for carrying out a sewage scheme. The Council retained the services of Mr. Bailey Denton, who proposed a plan which was not altogether approved, and not altogether rejected. At the last meeting of the Council a letter was read offering the gratuitous services of the advisers (engineering, we presume) of the Local Government Board, for the carrying out of some sewage plans—we do not exactly know what. The professed object of the letter, which may or may not have received the sanction of the chief officials of the Board, is to allow their engineering officers to carry out gratuitously the plans for the drainage of the district, without the "expensive assistance of "Mr. Bailey Denton." This offer, of course, has a great charm for the meanest town in England; but we beg to call the attention of all professional engineers in practice to this proposal on the part of the Local Government Board. Supposing such proceedings be persevered in, Whitehall and Great George Street may as well put up their shutters. "Grandmotherly govern-"ment" appears to be coming to something at last. Local Authorities, incapable of settling matters which they are called into existence to decide, must, as we may say, be spoon-fed by a Central Authority. When a Local Authority sinks so low as that of Colchester, perhaps it will be as well to take as much power out of their hands as possible, and leave them to the control of the Central Authority. But this is not what is meant by local self-government.

On Friday evening last, Mr. Baillie-Cochrane brought forward his motion relative to local taxation in the Metropolis. His speech constituted a long indictment against the Vestries and District Boards, whom he accused of incompetence, extravagance, and jobbery. There is always and everywhere an outcry against rates, which is shared in by all grades of the community, but is most loudly expressed by the lower middle class, who consider their substance eaten up by the exorbitant demands of the Local Authorities. They see but little direct benefit derived from the expenditure, and cannot, of course, appreciate the indirect advantages which flow from effective parish management. But Mr. Cochrane complains that there is no effective management. That there is much incompetence among the Boards, we fear must be admitted; that they are sometimes extravagant, is beyond doubt; and that jobbery is practised on a considerable scale, we think there is no question. But, after all, it may be taken as a fact that, on the whole, the work of our Vestries is fairly well done. The streets, it is true, might be better lighted; our thorough-

fares might be better cleansed; and dusting performed with more regularity. Sanitary improvements, too, might be pushed on with more vigour. But any changes for the better must be accompanied by additional expense, and against this the ratepayer would strongly protest. Mr. W. E. Forster appears to think that the inhabitants of the Metropolis are better able to pay rates than those of many large provincial towns. That may be so, but it is not an opinion commonly entertained in London. There is no doubt that the work done by our Vestries might be much better and more cheaply performed; but economy will never be effected so long as the work is divided among thirty-seven different authorities, each one provided with a separate staff of officers. Not until London has a complete municipal organization can any great change for the better be anticipated. If we thought that the Select Committee proposed by Mr. Cochrane could have at all aided progress towards this most desirable end, we should be sorry it was not appointed. But nothing of the kind was likely to result from their labours. This question will turn up every year, but we think he will be a very old inhabitant indeed who witnesses any change for the better in the administration of Metropolitan affairs. Mr. Cochrane's attack on the Gas and Water Companies we may pass over. When he is stronger in his facts his allegations may deserve notice, but at present they call for no remark.

Communicated Article.

EXPERIMENTS WITH GENERATOR FURNACES.

IV.

By "Isca."

Following up the previously recorded experiments with Zwickau coke, the Commission of the German Gas and Water Managers Association have made experiments with coke from English coal, and the series thus instituted is therefore of more immediate interest to English gas engineers. The experiments were made directly upon the termination of the earlier investigation, and the same conditions consequently applied to them which had affected the others, with the slight difference that the furnace was, of course, rather the worse for wear and tear. This circumstance must be borne in mind, when comparing the relation between CO and CO_2, in the gases produced from English coke, as against the analysis of the previously employed Zwickau coke. It has been observed that a considerable proportion of the latter constituent originated in the infiltration of air through the fire-brick walls of the generator, and this proportion would be increased as the furnace became shaken and cracked by use; therefore it should be understood that the combustible value of the English coke is really higher than is indicated by the actual figures.

The coke in question was supplied by the Altona Gas-Works, and was made, according to Mr. W. Kümmel, from equal proportions of Leverson Wallsend and Nettlesworth Primrose coals. The methods of examination and calculating the results were precisely the same as before, and the tables are constructed in the same manner.

Fifteen experiments were made, which may be divided into two classes, viz.:—

I.—Experiments A to H, with slit-generator.

II.—Experiments I to P, with grate-generator and steam inlet.

Thus there are eight experiments with the slit-generator, and seven with the grate-generator, with the addition of steam. Although the latter were made first, the necessary apparatus being already fixed, the former are first recounted, in accordance with the established precedent.

Table I.—*Principal Results of Working with Slit-Generator.*

Experiment.	Duration of Experiment.	Average Pressure in Gas Channel.	Gross Consumption of Coke during the Experiment.	Coke Consumption per 24 Hours. Kilos.	
	Hours.	Inch.	Kilos.	Gross.	Less Refuse 17·3 per Cent.
A	25	− 0·17	1875	1802	1490
B	24	− 0·25	2320	2320	1919
C	20	+ 0·04	616	739	611
D	11	− 0·34	1375	3000	2481
E	20	+ 0·07	210	252	208
F	23	− 0·08	1260	1315	2888
G	17	+ 0·01	590	833	689
H	24	− 0·12	1600	1600	1323

Table II.—*Chemical Composition of the Gases with Various Draughts.*

No.	Experiment.	Average Pressure in the Gas Channel.	Percentages in the Gas of CO_2	Percentages in the Gas of CO.	Temperature of Gas.
					Deg. Fahr.
I.	E	+ 0·07	—	—	—
II.	C	+ 0·04	2·1	28·5	932
III.	G	+ 0·01	2·4	27·8	—
IV.	F	− 0·08	2·4	29·2	1220
V.	H	− 0·12	3·1	25·5	1202
VI.	A	− 0·17	4·6	26·3	1517
VII.	B	− 0·25	7·0	21·8	1724
VIII.	D	− 0·34	4·9	21·5	1905

Table III.—*Composition of the Coke.*

Consumption of Coke.	Quantity of Refuse.		Composition of the Refuse. Coke.		Ashes.		Clinker.		Gasified Coke, less Refuse.
Kilos.	Kilos.	Pr. Cnt.	Kilos.	Per Cnt	Kilos.	Per Cnt	Kilos.	Per Cnt	Kilos.
875	29·5	3·37	2·5	0·29	11	1·26	16·0	1·83	845
1,368	249·5	18·24	18·5	1·35	56	4·09	175·0	12·79	1,118
2,180	151·5	6·95	4·5	0·21	12	0·55	135·0	6·19	2,028
1,295	197·5	15·25	7·0	0·54	53	4·09	137·5	10·62	1,097
1,545	221·0	16·82	10·5	0·89	41	3·12	169·5	12·90	1,324
660	169·5	25·68	23·5	3·56	61	9·24	85·0	12·88	490
1,110	248·5	22·39	30·5	2·75	65	5·86	153·0	13·78	861
1,440	237·0	16·46	33·0	2·29	47	3·26	157·0	10·90	1,203
1,465	264·0	18·02	19·5	1·33	57	3·89	187·5	12·80	1,201
100	310·0	310·00	41·0	41·00	116	11·60	153·0	15·30	210
12,038	2078·0	17·26	190·5	1·58	519	4·31	1368·5	11·37	9,960

I. *Experiments with Slit-Generator.*—The draught during these experiments varied between a *pressure* of 0·07 inch and a *vacuum* of 0·345 inch, as taken in the gas outlet channel, and the consumption of coke varied from 252 kilos. to 3000 kilos. The principal results observed are set forth in the Tables I., II., and III. The relation between draught and coke consumption will be at once perceived by these tables. Generally speaking, for every millimètre (0·0393 inch) increase of draught there is an increase in the consumption of coke of about 200 kilos. (440·8 lbs.) per 24 hours. The other results of increased draught are a rise in the proportion of CO_2 in the effluent gases, and also of their sensible temperature.

Great attention should be paid to these facts, as they are evidently of importance, not only in the present case, but in respect of ordinary furnaces. The small difference of vacuum, of which mention is made, is remarkable, read by the light of its effect. A certain vacuum is, of course, necessary in all cases; but it will generally be found that the difficulty in regulating retort furnaces is not in providing the requisite draught, but in preventing an excess. If another argument against tall chimney-shafts had been required, surely it is here at hand, for it is not too much to assert that with a draught in the main flue of over 1 inch, it is impossible, remembering the permeability of brickwork before referred to, to bring down the draught of each setting to the absolute minimum.

But to return to the experiments. The fusibility of the clinker and its behaviour with the fireproof material of the slit-stones of the generator hearth are important points bearing on the practical working of the apparatus. The clinker of the English coke was very fusible; it flowed down continuously over the slit-stones, and even trickled down to the sole of the ash-pit, where it formed a fibrous glassy conglomerate. It was easily removable, and there was consequently no trouble or interruption to the regular work. In a few days the slit-stones were found to be corroded. The interior angle of the stones, originally obtuse between the apertures, became gradually more acute, and broken at the edges, even with careful clinkering. In ten hours working the width of the slits increased from 0·23 to 0·35 inch. The higher parts of the generator were less affected.

In accordance with the general programme, the gases produced were examined chiefly for CO_2 and CO. Yet it was thought desirable, having regard to the experiments with the grate-generator and steam, to find the quantity of H, if any, present. The H might be expected to arise from the complete gasification of any coke containing tar, or which had only been partly carbonized in the retorts, and in that case would decrease from the addition of fresh coke to the complete combustion of the same. Or another source may be found in the water contained in the quenched coke from the retorts. When the hot gases from below absorbed the steam from the fresh damp coke, a decomposition of the CO with the steam would take place, resulting in the simultaneous formation of H and CO_2, thus—

$$CO + H_2O = CO_2 + 2H.$$

Average samples of the gases, taken between the charges, contained, on repeated examinations, such small quantities of H, that it could not be well determined by the means employed for the purpose, being generally barely 1 per cent., even when sampled immediately after charging, with small quantities of coke. It is otherwise when large quantities of coke are put into the generator at one time, as in raising the heat. This period of heating previous to actually reckoning the experiments was adopted in order to get a fair starting-point, and to find the maximum quantity of H in the gases with dry working. The generator, having been lit, was filled with about 700 kilos. of coke in the next six hours, as fast as the fuel caught fire. Samples of gas taken during this period contained—

CO_2 ..	4·6 p. ct.	CO ..	24·8 p. ct.	H ..	2·7 p. ct.
CO_2 ..	2·5 p. ct.	CO ..	25·9 p. ct.	H ..	3·0 p. ct.

By another method, the average proportion of H in the gases produced by the coke may be ascertained from the H contained in the coke itself. According to an analysis made, a well-carbonized coke contained, by weight, 83·56 per cent. of carbon, and 0·41 per cent. of hydrogen. To deduce from this ratio, by weight, the relation of the volumes of the produced carbonic gases and the hydrogen, a similar procedure to that in use for ascertaining the quantity of steam admitted to the grate-generator may be followed; *e.g.*, we can divide the percentage of carbon by half its atomic weight, which is 12, and divide the hydrogen by its atomic weight, which is 2. The proportion of these numbers being as 6 to 1, the relation of the

volumes of the carbonic gases and the hydrogen is found by dividing the percentage of C by 6, that of H being unaltered. Thus, with the above constituted fuel, there are 83·56 ÷ 6 = 13·93 volumes of carbon gases and 0·41 volumes of H; or, in other words, the total percentage of carbon gases in the generator being = 30, the average percentage of H present will be = 1.

Of the eight experiments, A to H, we may specially notice D and E, which are rather remarkable. They form the limits of the series of experiments, D having the strongest draught—0·34 inch—and E having a pressure in the gas channel before the valve of 0·07 inch. During experiment D, observations were made as to the height of fuel necessary for the complete reduction of the CO_2 to CO, even with the strongest draught. During four hours working, 450 kilos. of coke were gasified, and the height of the fuel in the generator had decreased from nearly 5 feet to about 2 ft. 6 in.; but no alteration in the composition of the gas was perceptible. A sample, taken immediately after charging, contained 5 per cent. of CO_2, and 21 per cent. of CO. The average composition of all the samples was 4·8 per cent. of CO_2, and 22 per cent. of CO. A period of uninterrupted burning followed upon the charging, and at the end of the fourth hour the gas in the channel contained 4·4 CO_2, and 21·4 CO, while the height of fuel was only about 20 inches, and then the quantity of CO_2 increased to 7 per cent. When the generator was opened, a light red flame arose from it, producing a white smoke. This was owing to the evaporation of salts in the intense heat. The inside of the generator was glowing most fiercely, like the sun itself, and could only be viewed through green glasses. By this means it was ascertained that the slits were only covered by a thin layer of fuel. Thus it appears that a thickness of about 20 inches of coke is quite sufficient for producing a good heating gas, even with a very strong draught, and using large English coke, and an opinion formerly entertained seems to be confirmed; that is to say, that *at such a high temperature the coke is burnt direct to CO*, not to CO_2; CO_2 changing at very high temperatures to CO and O, and CO being, under such circumstances, the more durable gas. During five hours working, 600 kilos. of coke were gasified.

Immediately on the completion of experiment D, the channel valve was closed as tightly as possible, so that a pressure of 0·09 inch was created, which after a time fell to 0·07 inch. Soon after the charging, there was found to be 1 per cent. of CO_2 and 28 per cent. of CO in the gas. During the next 20 hours (experiment E) the consumption of coke was small—only 210 kilos—and the temperature of the gas, which in the former experiment had risen to 1905° Fahr., sank in about twelve hours to only 752°. The change in the composition of the gas was most obvious. The gas having contained only 1 per cent. of CO_2 at the commencement, was found, twelve hours later, to contain 7 per cent. of CO_2, and after a further period of six hours working, it contained 6·8 per cent. of CO_2, and 21·2 per cent. of CO. No air could possibly find its way into the generator, to consume part of the CO, because of the interior pressure of 0·07 inch, which caused the gas to escape by every sight-hole which was opened. Gas taken from the lowest hole, at a height of 20 inches above the slits, was similar in constitution to the sample taken from the outlet channel — 6·8 per cent. of CO_2, and 23 per cent. of CO. Thus the gas undoubtedly passed slowly through over 4 ft. 6 in. of coke containing 6 per cent. of CO_2, without any reduction taking place; and this circumstance can only be explained by the fact that there was not that high temperature within the generator at which the glowing coke reduces the CO_2. The fuel was only faintly incandescent at the slit, and higher up it was only dark red. In the normal state of working, measuring the temperature within the generator by means of the copper cylinder of the water-pyrometer could not be thought of; but the temperature of the fuel itself, at a height of 2 ft. 6 in. above the slit, was found to be 1607° Fahr.

Although this circumstance of an incomplete reduction of CO_2, through deficient draught, very seldom occurs in practical working, it is interesting, as indicating a method of ascertaining the loss of heat by working slit-generators. At the end of the preceding experiment, the gas left the white-hot generator at a temperature of 1905° Fahr., and in the ensuing 14 hours the temperature of the generator had so far decreased, in spite of the consumption of 210 kilos. of fuel, that there was not heat sufficient to cause a complete reduction of CO_2, and the gas entered the channel at a temperature of only 752° Fahr.

In experiments B and H, observations were made as to the influence on the draught of the removal of clinker from the slits. It has already been observed that clinker caused a sudden decrease of draught, which was shown by the curves of the recording pressure-gauge, thus affording a means of controlling the stoker. It was now of interest to discover at what intervals cleaning of the slit was necessary, and what might be the influence of a longer or shorter period. For this purpose the pressure-gauge was read and noted before and after the cleaning or clinkering. It appeared from fifty such observations that, with an average draught of 0·08 inch, and a consumption of 1200 kilos. of coke in 24 hours, after an interval of 1½ hours between clinkering, the draught diminished by about 0·12 inch, the obstacles being, therefore, lessened by that amount after the removal of the clinker. At intervals of three-quarters of an hour the difference of draught before and after clinkering was about 0·04 inch. From this it is proved that the slits must be cleaned at least every hour, or the working of the generator would be impaired by obstructions at that point.

SCARCITY OF WATER AT BRADFORD.—Notwithstanding the recent heavy rainfall, the low-level water supply of Bradford has yielded comparatively little water lately, and the central part of the borough has been put on a limited service, the water being turned off during the night.

Correspondence.

[*We do not hold ourselves responsible for the opinions expressed by Correspondents.*]

THE ANALYSIS OF GAS COALS.

SIR,—Before leaving with my family for the North, I had the pleasure of a hasty perusal of the letters of Messrs. Scott, Young, and Miller in your previous issue of the JOURNAL, replying to my observations on Mr. Scott's paper on the analysis of coal. I have to acknowledge the courtesy of the respective writers, who, while condemning the analysis of coal conducted on a small scale, as not representing its commercial value, disclaim any intention of throwing reflections upon the accuracy of the analysts.

The question, therefore, seems to resolve itself into this form—viz., Is the quantity and quality of gas obtained in practical working to be regarded as the standard of value? If so, is it not equivalent to weighing with a false balance? The imperfection arising through various causes in practical working, is a varying and inconstant quantity, and, though a factor of great importance, it can neither be measured nor weighed. Thus the standard of the same quality of coal will necessarily be subject to similar variations. It will be obvious, therefore, that tests made in this way may afford evidence of the working of one manager against another, but can be of no possible use otherwise, as they merely give the value of the coal, *plus* the imperfections of the working, which are constant, though varying elements.

In our photometrical observations we select the burner most suitable for the gas to be operated upon. In the examination of a coal it is equally desirable to arrive as near to its *absolute commercial value* (if I may be allowed the expression) as our appliances may render possible, and to bring up the practical working as near as may be attained to that standard. With the best appliances at our disposal, we fail to obtain the full amount of light capable of being given out by the gas, and in the distillation of coal we cannot realize more than the quantity of light-giving materials it contains.

The plea advanced that some gas directors compare the working results with the analyses, and find them short, is no argument for attaching a false or reduced value to the coal in order to square with imperfect knowledge on the matter. Neither can I agree with the suggestion to name a percentage loss on the face of the analysis, which, in my opinion, would be utterly useless, and which no practical analyst would adopt.

I have also had the pleasure of perusing Mr. Greville's letter, in your issue of the 10th, and can scarcely agree with that gentleman when he says that in the experimental apparatus, no exhauster being employed, the retort is subject to the back pressure of the purifier, and necessarily tends to a partial decomposition of the hydrocarbons. Did this condition obtain generally with analysts, there would doubtless be some loss; but I know of no reason why this *should* obtain, and I apprehend the cause must be sought for in other directions.

Mr. Greville thinks the real cause of the deficiency often found to exist between the results of the gas manager and those of the analyst is most probably due to a variation in the coal itself. That there are considerable differences in the quality from a seam of coal is certainly correct, and capable of substantial proof; but I venture to express a doubt whether the discrepancy between the commercial value and practical results is alone due to this cause. My experience leads me to the opinion that the alterations in the physical conditions of a seam of coal form only one, and that probably the least important of a series of causes which operate to reduce both quantity and quality of gas on the large scale.

Dunellan House, Strathyre, N.B., June 13, 1879. JAMES PATERSON.

SIR,—I was greatly surprised—and, I may add, disappointed—at the tone adopted by your correspondents in answer to Mr. Paterson's letter in the JOURNAL of the 27th ult., in which he ascribes the difference between the analysis of coals and the results actually obtained, to imperfections in the ordinary mode of working. To my mind, nothing can be clearer than the proposition, that if a given coal can be shown to have a certain value in the laboratory, there is no reason—or, at all events, there should be none—why similar results should not be obtained on a large scale. I cannot conceive a more unscientific—not to say ridiculous—practice than for a gas manager to make a test of a sample of coal, and then deduct from 10 to 25 per cent. from his results, to obtain what he will probably get on his works.

Mr. Young says, in your issue of the 3rd inst., that the value of a coal is simply what it is worth to gas-makers working on a practical scale, and he further asks, what objection can be urged against having the coals analyzed on a commercial, instead of a homœopathic scale. To the first remark I would ask, Was the value of Newcastle coal simply 9500 feet per ton when that was all that could be obtained from it a few years ago, remembering that at present it is yielding 10,000 feet per ton at several London works, and at some places even more? And, in answer to his second question, I would observe that the objection to testing coal on what he terms the commercial scale is, that whatever errors are committed on the works are also committed in his analysis, and therefore are worthless for giving the absolute value of the coal.

By the absolute value of a coal, I take it, Mr. Paterson means the utmost that can be got from it, and I should advise gas managers not to be content till they have obtained a similar value on the practical scale. I am aware that few managers can as yet realize this absolute value; but, for truth's sake, let us, as scientific men, look the facts fairly in the face, and admit our inability to do so. Let us hope that in the course of a few years we shall so improve our working that we may feel that we have made the best use of our coal, and that it is not necessary to debit an analysis with a certain percentage to make it conformable to a less perfect mode of working.

Mr. Young, for the convenience of his argument, attributes one of these meanings to Mr. Paterson's remarks—viz., (1) that the analyses are not commercial analyses; or, (2) that the mode of working at Galashiels was defective, and "that the best commercial results are not, therefore, obtained;" or, (3) that coal must be distilled in charges of a

few pounds to obtain results similar to the analysis. No. 1, I have already disposed of; No. 3, of course, need not be discussed; I have then only to deal with No. 2.

Mr. Paterson's meaning evidently is that all works where the absolute value of the coal is not obtained, are defective in that respect. What have commercial results to do with the question? I know of works making 50 millions a year, that produce less than 9000 feet per ton from Newcastle coal (and that, too, with a liberal percentage of Lesmahagow), and yet pay a 10 per cent. dividend. So commercial results have nothing to do with efficiency of working. I strongly deprecate the idea that, because a manager is obtaining good commercial results, he ought to remain satisfied. There are many things that produce good commercial results besides high makes per ton—*e.g.*, smallness of capital, proximity to coal-fields, &c.; and I am surprised at Mr. Young adducing this as a proof of scientific working.

Of course, if the sample analyzed is not the same as that used in practice, as suggested by Mr. Greville in your last issue, no value can be attached to the analysis. This is outside the question at issue.

C.

THE CHEAPEST GAS IN SCOTLAND.

Sir,—Among the "Trade Notes from Scotland," in your issue of the 3rd of June, is the statement that "there is certainly no instance of cheaper gas in Scotland than that supplied to the consumers in Dundee." Statements to the same effect have repeatedly appeared in the Scotch daily newspapers; but now, when your official correspondent repeats the expression, the statement must be challenged in the interest of other companies, though I, no doubt along with others, am well pleased to see that the Dundee Corporation Works, under the able superintendence of Mr. M'Crae, are supplying gas at lower rates than the enterprising community formerly had to pay.

On reference to the past, it will be found that in the year ending April, 1876, the Dundee Corporation made 285 million cubic feet of gas, which they sold at 5s. per 1000, and the net profit, according to your official correspondent's report, was £8669. The illuminating power of the gas was 27·83 candles. During the year ending July, 1876, the Galashiels Gas Company made about 31 million cubic feet of 29-candle gas, which they sold at 4s. 7d. per 1000 feet, and made a net profit to the Shareholders of £2175. The rate was, in July, 1876, reduced to 3s. 9d. per 1000, and the Dundee rate to 4s. 7d. per 1000, with 5 per cent. deduction for cash within 28 days. In February of the year 1876, the Dundee Gas Commissioners considered the advisability of reducing the quality of the gas, and, though I cannot find in the file of your Journal any exact statement as to whether or when they decided to do so, I infer it must have been done, for, to a meeting of the Commission, held on Dec. 14, 1876, Mr. Kinnear, the Sanitary Inspector, reported that the illuminating power of the gas was 26·8 candles. During the year ending April, 1877, the average illuminating power of the Dundee gas was 26·49 candles (*vide* "Trade Notes from Scotland," July 16, 1877), and the same authority informs your readers that, in December of the same year, Mr. Falconer King reported the Dundee gas as equal to 26·63 candles. I am, therefore, safe in assuming that during a portion of 1877, and ever since, the standard of Dundee gas has not been much over 26 candles. The price for 1877 was 4s. 7d. per 1000, with the 5 per cent. abatement for cash in 28 days, and the Commissioners made that year 292 million cubic feet, and reduced the rate at the year's end to 4s. 2d. per 1000. During that same twelve-month the Galashiels gas, of 29-candles standard, was sold at 3s. 9d., and from a sale of about 31 millions the Company seem to have cleared £1500, for they paid a dividend of 10 per cent., and voted £2200 for new pipes, of which some £654 was a balance from the previous year's account. I cannot give the comparisons for 1878, as no account from Galashiels is recorded in your Journal; but the Dundee profit was £3131, and the next year's sale began at the diminished rate of 3s. 11d. per 1000 feet, with the 5 per cent. abatement for cash. Your correspondent, in view of this further reduction, credited the Dundee Commissioners with supplying "the cheapest gas in Scotland," with "one exception—namely, Galashiels," of which the price had been, for that and the preceding year, only 3s. 9d. per 1000 feet.

We come now to the present, and find that the Commissioners of the northern burgh have resolved to sell, during the year ending 1880, their 26-candle gas at 3s. 8d. per 1000 feet, or, allowing for the abatement for cash, at 3s. 6d. per 1000, and on that your correspondent makes the affirmation which I challenge—namely, "that there is certainly no instance of cheaper gas in Scotland."

No one has any means of knowing what the rate in Galashiels will be for that year, as the annual meeting will not be held until after the close of this month; but, assuming it will remain at 3s. 9d. per 1000, at which it has stood for the past three years, my contention is that it will be cheaper than the Dundee gas at 3s. 6d., for the Galashiels standard is 29 candles, and by simple proportion I find that if Dundee 26-candle gas be worth 3s. 6d., the Galashiels gas is worth fully 3s. 10¾d. per 1000 feet, and, therefore, at 3s. 9d. it is cheaper than the Dundee light. The northern burgh are supplied with 26-candle gas at 3s. 6d., and, were the Galashiels standard reduced to 27·8 candles, and sold at 3s. 9d., it would be worth as much as the Dundee light. But it is 1·2 candles higher in illuminating power, and is, therefore, cheaper by that amount.

My conclusion, therefore, is that though the consumption of gas in Dundee is about ten times that of Galashiels, the southern burgh has still the credit of beating its northern competitor in gas-making.

Innerleithen Gas-Works, June 6, 1879. Robert Miller.

Pollution of the Thames.—The Conservators of the River Thames have addressed a notice to the Leatherhead Sanitary Authority requiring them to discontinue within thirteen months the discharge of sewage into the Thames from the River Mole, in accordance with the Rivers Pollution Prevention Act. The notice has been sent to the Epsom Rural Sanitary Authority by the Leatherhead Parochial Committee, but returned to the latter. The residents in Leatherhead are proposing to form part of their parish into a special drainage district, which, it is believed, will obviate the present state of affairs.

Parliamentary Intelligence.

HOUSE OF LORDS.

Friday, June 13.

The Examiners reported that the further Standing Orders applicable to the following Bills have been complied with:—Cardiff Corporation, Gas and Water Provisional Orders Confirmation, Morecambe Gas, Stratford-upon-Avon Corporation and Local Board of Health, Wisbech Gas.

The Examiners reported that no further Standing Orders are applicable to the following Bills:—Blackburn Improvement, Over Darwen Corporation, Plymouth and Stonehouse Gas, Preston Gas, Stourbridge Gas, Weardale and Shildon District Water, Wombwell Local Board.

The Examiners reported that the further Standing Orders applicable to the Colchester Water Bill have not been complied with. The certificate of non-compliance was referred to the Standing Orders Committee.

The following Bills were brought from the Commons, read the first time, and referred to the Examiners:—Alliance and Dublin Consumers Gas, Blackpool Extension and Improvement, Derby Improvement, Knutsford Light and Water, Leicester Corporation, Lancaster Gas, Newcastle-upon-Tyne and Gateshead Gas, Queenstown Gas, South Shields Gas.

Dun Drainage Act Amendment Bill (Lords), West Kent Main Sewerage Bill (Lords),—returned from the Commons agreed to, with amendments, which were considered and agreed to.

The Birmingham Gas, Rotherham Borough, and Southend Water Bills were referred to a Select Committee, consisting of Earl Ducie (Chairman), Earl Dartrey, Lord Zouch of Haryngworth, Lord Oranmore and Brown, and Lord Gormanston; to meet on Tuesday, June 17.

Petitions against the following Bills were presented:—Gas and Water Provisional Orders Confirmation (Thirsk District Water Order), from Inhabitants of Thirsk; Preston Gas, from (1) Corporation of Preston, (2) Walton-le-Dale Local Board; Wombwell Local Board, from the Elsecar, Wentworth, and Hoyland Gas Company.

Petitions were presented against alterations in the following Bills:—Mirfield Gas, from the Liversedge Local Board; Morecambe Gas, from the Poulton, Bare, and Torrisholme Local Board of Health; Over Darwen Corporation, from Thomas Hodgson and James Finch (Trustees under the will of James Hodgson, deceased).

HOUSE OF COMMONS.

Monday, June 9.

Glossop Gas Bill,—Lords amendments agreed to.

Dun Drainage Act Amendment Bill, — read the third time, amendment made, and Bill passed.

Bills read the third time, and passed:—Alliance and Dublin Consumers Gas, Blackpool Extension and Improvement, Knutsford Light and Water, Leicester Corporation, Newcastle-upon-Tyne and Gateshead Gas, South Shields Gas.

Tuesday, June 10.

Queenstown Gas Bill,—read the third time, and passed.

West Kent Main Sewerage Bill (Lords),—read the third time, and passed, with amendments.

Derby Improvement Bill,—as amended, considered; amendments made; Bill to be read the third time.

The Lancaster Gas Bill was reported.

THE METROPOLITAN BOARD'S EXPENSES IN CONNECTION WITH THE LATE WATER BILLS.

On the motion of Sir J. M. Hogg, a Bill to authorize the Metropolitan Board of Works to defray expenses incurred in relation to the promotion of certain Bills in Parliament relating to the supply of water to the Metropolis, was ordered to be brought in by Sir J. M. Hogg, Sir Charles Dilke, and Mr. Rodwell. The Bill—Metropolitan Board of Works (Water Expenses) Bill—was accordingly presented, and read the first time.

Thursday, June 12.

Colwyn Bay Water Bill (Lords),—as amended, considered; amendment made; Bill to be read the third time.

Lancaster Gas Bill,—as amended, considered; to be read the third time.

METROPOLITAN BOARD OF WORKS (WATER EXPENSES) BILL.

Sir Henry Holland gave notice that on the second reading of this Bill he will move—"That it be read a second time upon this day three months."

Friday, June 13.

Derby Improvement Bill, Lancaster Gas Bill,—read the third time, and passed.

LIGHTING BY ELECTRICITY.

Report of the Select Committee brought up and read.

A petition against conferring special powers was presented from the Sheffield United Gas Company.

LOCAL TAXATION IN THE METROPOLIS.

On the order for going into Committee of Supply,

Mr. Baillie-Cochrane, pursuant to notice, rose to call the attention of the House to the great increase in the local taxation of the Metropolis, while the Vestries fail to carry out any sufficient sanitary arrangements; and to move for a Select Committee to inquire into the powers of the Vestries, and their administration of the funds at their disposal. Some of the most eminent of our statesmen had, he said, given their attention to this subject. The question had, too, engaged the attention of Royal Commissions and Select Committees, and Bills had been introduced on the subject. As a matter for legislation it had engaged the attention of such men as Sir George Grey, Sir G. Cornewall Lewis, and Mr. Buxton. The last to direct attention to it with a view to legislation was the noble lord the member for Haddington (Lord Elcho), who urged the claims it had on the consideration of Her Majesty's Government. The question was growing in importance every year. The Registrar-General had stated that the population of the Metropolis increased at the rate of some 75,000 annually, and that in the course of the last ten years about 150,000 additional houses had been built. The expense of local administration had immensely increased, and was increasing. The Vestries made rates on the parishes, and declined to publish satisfactory reports showing how the money they raised was expended. They were, however, not slow in demanding that the action of other bodies should be inquired into. It might be said that everything had very much improved since the establishment of the Metropolitan Board of Works, and that he was prepared to admit; but this was no reason why householders and ratepayers should be subjected to unnecessarily heavy burdens. Under the existing system the ratepayers paid in some instances at least a third more than they ought to be called upon to do. The mistake was in the Vestry system. In consequence of that system, with all its anomalies, the state of the sewers and pavements in many districts was most unsatisfactory. The Vestries fought amongst each other on questions as to the varying merits of wood pavement and macadam. One result of this was that practically nothing at all was done in the way of improvement. He

believed that one of the greatest evils of the present system was connected with the auditing of the Vestry accounts. Some parishes were undoubtedly well managed in this respect, but he was credibly informed—for the information was based on a published document—that in some cases the Auditors could not read or write. In bringing forward this question of Vestries, hard as some of the things he had to say might appear, it ought to be remembered that he was only treating them as they had treated others. They had objected to the management of the funds of the City guilds, and it was only reasonable, seeing that charges of mismanagement had been preferred against themselves, that they also should be subjected to inquiry. As an instance of the magnitude of the question, he might state that the Paddington charities alone were estimated to amount to no less a sum than £2,290,000 a year, and a paper had been published by the Paddington Ratepayers Association, which gave some rather curious details as to the manner in which that public money was spent. What the public chiefly had to complain of was that there was no inquiry into these matters. They had simply to pay. Such a state of things, he thought, was without justification, and ought in some way to be remedied. For his own part he considered it hardly possible for a remedy to be provided by a private member. He thought that the least that could be done by the Government would be to appoint a Board of Auditors to investigate these Vestry accounts, and that the report of the Auditors should be published as a parliamentary paper.

Mr. Hankey thought that the mere appointment of Auditors would hardly carry out the full object contemplated in the resolution of the honourable gentleman, who condemned the general management of the Metropolis, yet seemed to be content to accept only a modified means of remedy. He went further than the language of his honourable friend. The management of the Metropolis was, he thought, simply abominable. It was a disgrace to such a large city as London, which suffered not only from bad management, but want of uniformity of administration. It was an erroneous principle to put the Fire Brigade under the control of the Metropolitan Board. In all other large cities it was under the control of the police, and the extinguishing of fires was part of the police duties, and so it ought to be in London.

Lord Elcho considered that his honourable friend had done good service in calling attention to the subject. That a change was necessary was so patent that it did not require much argument to enforce it. There was no power that could make the Vestries repair the streets or water the roads. The Metropolitan Board of Works ought to have more power, be merged in some other body, or be abolished altogether; and the appointment of an Auditor would be a good beginning in dealing with this subject. He hoped the House would have an assurance from the Government that they intended to deal fully and effectually with the subject.

Mr. Sclater-Booth said the Vestries of the Metropolis were governed by an Act of Parliament passed 20 years ago, and he did not think that sufficient time had elapsed, or the circumstances were such as to call for the revision of that Act. He was not, however, prepared to defend the Vestries from all the charges that might be brought against them, and it should be borne in mind, with respect to the water and gas supplies of the Metropolis, that the Vestries had nothing to do with them, and whether the provisions in force for effecting those objects were adequate or not, he would not then inquire. The question raised by the present motion was one of great importance. The assessment of the Metropolis, with regard to the question that the honourable gentleman had brought under the notice of the House, was as fair, uniform, and satisfactory as could be expected. He found that in 1869 the Vestries spent £1,439,613, and out of poor-rates, &c., £2,155,736, making a total of £3,595,350; and in ten years later—in 1878—the Vestries spent £2,647,972, and out of poor-rates, &c., £2,396,972, making a total of £5,044,944, showing a considerable increase of expenditure within that time, whilst the rateable value of the Metropolis had risen within the same time from 16½ millions to 23½ millions. He was of opinion that the House would not be prepared to adopt the motion of the honourable gentleman.

Sir A. Lusk said that the Vestries were elected bodies, and if they did not do their duty, their electors, the ratepayers, had the opportunity of expressing their opinion on their conduct by not re-electing them. He challenged honourable members to show where a city like London was better managed in this respect, for it was, in fact, the most healthy city in the world. He thought the Vestries deserving of great credit for the manner in which they discharged their onerous duties for the benefit of the general public. He defended the government of London, and again urged that it was as well managed, if not better, than any town in England.

Mr. C. B. Denison said that two years ago he gave notice of a motion for a Committee to inquire into Vestry management, and especially into the paving, lighting, watering, and scavengering of the streets and houses of London; and if he found encouragement from other members of the House, he should be inclined to urge upon the House the desirability of appointing such a Committee. No doubt the members of the Vestries, who undertook a vast amount of work without remuneration, came in for a great deal of abuse, particularly from the outside public. He should, however, despair of any improvement being effected if the House were to adopt the maxim of the last speaker—"*Quieta, non movere.*" In one or two respects there was a loud call for investigation and for improvement, especially in the management of the scavengering of the streets and houses. Compared with Paris and other capitals, the watering of the London streets was not what it ought to be. The watering and scavengering were practically in the hands of a monopoly. There were only a small number of contractors, and they arranged among themselves to do the work for different Vestries, so that the work was practically relegated to the same hands. The dirty state of the streets on Sundays was simply a reproach to the Metropolis. He had been told there was no remedy so long as the present system of contracting continued. With regard to the scavengering of houses, a system of black-mail prevailed throughout London, causing not only discomfort to the poorer classes of the population, but uncleanness and unhealthiness, which nobody seemed able to remove. Without preferring any charge of corruption or abuse of power or authority against the Vestries, he thought there was sufficient in the present state of things to call for inquiry.

Dr. Lyon Playfair reminded the House of the admission of the Home Secretary last year that this subject was so large, and that there had been so many Committees and recommendations on the local government of the Metropolis, that it would be the duty of any Government to take up the question, and to consider it in all its bearings. He hoped that if the honourable member (Mr. Baillie-Cochrane) did not press his proposal to a division, the Government would deal with the question next year.

Sir G. Campbell quoted some statistics regarding the parish of Kensington, in order to show that the general rates of the Metropolis had not been very much raised in the course of the last ten years, as compared with other large cities. With reference to Vestries, he objected to their constitution as too democratic, and urged that there was room for improvement in that respect.

Mr. R. Yorke said he had this year allowed himself to be elected a vestryman, partly from a feeling of curiosity. No doubt a majority of vestrymen were small tradesmen; but it was not surprising, considering the nature of the duties they had to perform, that gentlemen of higher pretensions did not serve. With regard to the statement of the honourable member (Mr. C. B. Denison), that the dust was badly laid in the streets especially on Sundays, he was in a position to say, as a member of the Street Cleansing Committee for the City of Westminster, that any complaint on that subject, if properly communicated to the Committee, would receive due attention. If some arrangement could be made by the Government for auditing the Vestry accounts, it would be a great advantage.

Sir C. Dilke said that when the system of watering the streets in Paris was compared with that of London, it should be remembered that in Paris they had fixed hydrants, and that it would be difficult to introduce these in London until they had some general body to manage the whole water supply. In comparing the government of London generally with that of continental cities, it should be borne in mind that in those cities the population was much more concentrated than here.

Mr. Cross said that the general question of the government of London was one of vast importance, but he would not attempt to deal with it in the present debate. Apart, however, from that great question, there were many minor points of considerable importance. There was the question of the administration of the Fire Brigade, and the question of the water supply, and he was one of those who did not think they should wait for a gigantic measure before they introduced any measure at all. There were also the defects in the administration of the present system of government, and that was rather the point to which the motion of his honourable friend was directed. He was glad to find that the honourable member for Gloucestershire (Mr. R. Yorke) had joined one of these Vestries. One of the great difficulties in these matters was to get gentlemen of standing, ability, and experience who would undertake the duties imposed upon the Vestries. They might be willing to give their time and trouble; but the great difficulty was the election they had to go through. The functions of the Vestries were extremely important for the actual comfort and daily life of the population. It was their duty to see that the drains in private houses were connected with sewers, and to compel the owners of houses to keep the footpaths in a proper state. Another matter which was well worthy of consideration was the auditing of the accounts. He hoped that this debate would lead the Vestries to do their duty in regard to these matters; and as regards the water supply and the Fire Brigade, he would be prepared to state his views on these matters when they came before the House.

Mr. Baillie-Cochrane's motion was then negatived without a division.

Gas Coal from Australia.—The *Sydney Morning Herald* announces that, on the 25th of March last, "for the first time in more than 20 years, a vessel cleared at the Customs for Liverpool direct, and with the largest, if not the first cargo of the kind ever shipped from the colonies to Europe. The *Victoria* takes 968 tons of shale, ordered from the Australian Kerosene Oil and Mineral Company, by one of the principal gas companies in England." It is understood that the Company referred to is the Liverpool United Gas Company.

Salford Corporation Gas Supply.—At a meeting of the Salford Town Council held last Wednesday, it was reported that on the 28th ult. the Borough Treasurer submitted to the General Gas Committee a statement of the gas accounts, made up to the 25th of March last, which showed a clear net profit of £10,000, the apportionment of which to the three districts of the borough in proportion to their gas-rental, in accordance with section 413 of the Salford Improvement Act, 1862, was as follows:—Salford, £5577 9s. 10d.; Pendleton, £2343 1s. 0d.; Broughton, £2079 9s. 2d. It was resolved that the gas profits be apportioned accordingly.

Explosion at the Sittingbourne Gas-Works.—On the evening of the 2nd inst., an explosion occurred at the works of the Sittingbourne District Gas Company, Limited, at Murston, owing, it is supposed, to an escape of gas, which came in contact with a light burning in the governor-house. The explosion caused the governor to split, and consequently the escaping gas, which comes from the holder through a 10-inch pipe, ignited, and a considerable volume of flame shot up into the air, the whole of the gas in the holder being consumed. Mr. Wood, the Manager of the works, was in Sittingbourne at the time of the occurrence, but on learning what had happened at once went to the works, and succeeded in extinguishing the flames. The second holder was then brought into use, so that the inconvenience which the consumers suffered did not last more than an hour. The damage, it is estimated, exceeds £100.

Derby Water-Works Company.—A special meeting of this Company was held last Thursday—Mr. G. Gascoyne in the chair—for the purpose of taking into consideration the Bill about to be introduced into the House of Lords, enabling the Derby Corporation to acquire the water-works undertaking. The Chairman said that the Bill promoted by the Derby Corporation for acquiring the undertaking of the Company was to be read for the third time in the House of Commons that night, and before it was introduced into the House of Lords it was necessary a meeting of the Shareholders should be held to approve of the Bill in the exact form in which it left the Lower House. It was entirely at their discretion whether they accepted or rejected the Bill. They could not amend it—they must either receive it or reject it as it now stood. After the clauses of the Bill, so far as they affect the purchase of the water-works, had been read, he moved—"That this meeting approves of the Bill now before Parliament, the short title of which is the Derby Improvement Act, 1879, subject to such modifications as Parliament may make therein." Mr. Currey seconded the resolution, and it was carried.

Nottingham Water-Works Company.—The annual meeting of this Company was held on Friday, the 6th inst.—Mr. Richard Birkin in the chair. The report of the Directors dwelt at some considerable length upon the negotiations between the Directors and the Corporation for the transfer of the works to the latter body, and expressed regret that the conduct of some of the Shareholders, in the very natural wish to obtain information, had rendered the negotiations more difficult than they otherwise would have been, but congratulated the Shareholders upon the ultimate success which had crowned the efforts put forth. The report closed with an acknowledgment of the great services rendered by Mr. R. Birkin, who conducted the negotiations on behalf of the Company, and by Mr. T. Hawksley, the Company's Engineer. The Chairman moved the adoption of the report, which was agreed to. On a motion being brought forward by the Chairman, authorizing the issue of £47,000 new stock for the works undertaken by the Act of 1878, there was an animated discussion, a Mr. Brewster advocating that the works should be gone on with by means of borrowed money. In the end, however, the proposal of the Directors was approved. Four retiring Directors were re-elected, and the meeting was afterwards made special, for the purpose of taking into consideration the water clauses of the Corporation Improvement Bill in the present session of Parliament. These having been read and explained, were passed unanimously, and votes of thanks to the Chairman concluded the proceedings.

Miscellaneous News.

BRITISH ASSOCIATION OF GAS MANAGERS.

Annual Meeting at Newcastle-upon-Tyne.

The Sixteenth Annual General Meeting of the Members of this Association was held last week at the Institution of the Philosophical Society, Newcastle-upon-Tyne—William J. Warner, Esq., C.E., of South Shields, the President, in the chair.

Tuesday, June 10.

The chair was taken at ten o'clock, and the proceedings were opened by the Mayor of Newcastle (Mr. T. Robinson), in the name of the inhabitants, welcoming the Association to the town.

The President thanked the Mayor for the reception accorded to the Association.

The minutes of the previous meeting, together with the statement of accounts, which had been printed and circulated among the Members, were taken as read.

New Members.

The Secretary (Mr. W. H. Bennett), on this and the following day, read the list of applications for membership, which were all acceded to. The names are here placed together for convenience of reference. They are:—

ORDINARY MEMBERS.

Atkinson, W. H.	North Shields.
Ball, C. E.	Loughborough.
Batten, W. T.	Leighton Buzzard.
Brown, C. B.	Halstead.
Cockburn, G.	Ramsgate.
Collier, W.	Saltburn.
Daniel, J. F. R.	Portishead.
Helps, J. W.	Leeds.
Lyon, W.	Sheffield.
Marks, T. T.	Llandudno.
Mead, H.	Chelmsford.
Mitchell, R.	Coatbridge.
Moodie, R.	Gateshead.
Morley, H.	Pendleton.
North, F. J.	Aldershot.
Owen, E.	Mold.
Parkinson, J.	Brighouse.
Peterson, N. O.	Copenhagen.
Price, W. E.	Hampton Wick.
Prins, J. J.	Cellesweg, Holland.
Ravenhill, W.	Dover.
Robinson, W.	Cullingworth.
Rollo, J.	Newcastle-on-Tyne.
Romans, D. P.	Edinburgh.
Rutter, S.	Brampton.
Stevenson, F. W.	Ventnor.
Terdrey, C. H.	Redruth.
Whyte, W.	Jarrow-on-Tyne.
Winchester, I.	Eastbourne.
Wood, G.	Maidenhead.
Young, J.	Marsden.

EXTRA-ORDINARY MEMBERS.

Bray, G.	Leeds.
Brown, R.	New Cumnock.
Haynes, F. F.	Stourbridge.
Leoni, S.	London.
Lever, E.	Manchester.
Runton, J. J.	Hull.
Trotter, G. A.	Stourbridge.

The President then delivered the following

INAUGURAL ADDRESS.

Allow me to give expression to the feeling of deep obligation to you for the position which I have the honour to occupy. While believing that the position of President of the British Association of Gas Managers—the position which has been filled by men of such attainments as Hawksley and Barlow—is the highest in the gift of the profession of Murdoch, Clegg, and Malam, I am not insensible to the honour which the successors of Lebon confer upon the Presidents of this Association. I acknowledge in your name our obligations, and reciprocate those fraternal sentiments which animated the Société Technique de l'Industrie du Gaz en France to the election of the Presidents of this Association to the position of Honorary Members. The reciprocation of honour now effected between that Society and this Association, I hope—and in expressing this hope I feel assured I am but expressing yours—may be followed by something better and more valued: the interchange of opinions, the reciprocation of papers, and the communication of facts affecting our common pursuits.

The total number of members as published in our last report is		666
From this has to be deducted—By withdrawals	4	
By death	6	
	—	10
Leaving at the commencement of this session		656
To this has now to be added—		
Ordinary Members	31	
Extra-ordinary Members	7	
	—	38
Total		694

The continuous and constant accession of members must be as satisfactory to you as it is gratifying to your Committee. This reference to our muster-roll, as some of us too well know, is not an unalloyed pleasure; it has its dark side when it becomes a roll-call to which, on these occasions, your President has to answer. This duty appears to me to be more mournful than on any previous occasion. The one who has faithfully recorded every thought which has flashed through our assemblies will do so no more; one who has presided over us has gone to his rest; and others more or less distinguished, though not so well known, or occupying such prominent positions, have gone from us doubtlessly equally lamented by old professional friends.

The deceased members are Messrs. E. White, Birmingham; T. H. Bouttell, Sleaford; J. Johnson, London; H. Hathaway, Lower Sydenham; D. Hunter, Greenwich; J. Hegarty, Colombo. The non-members who have been closely and professionally associated with us, and who have died, are Messrs. Richard Laming, Aylesbury; T. Wills, London; W. G. Valentin, London. To these I might almost add the name of Mr. Le Neve Foster—a gentleman whom to know was to respect, and to whom our Association has been much indebted for many acts of courtesy and kindness in his capacity as Secretary of the Society of Arts and Sciences.

The Journal of Gas Lighting has so recently given obituary notices of the non-members whose names I have recorded, that I need not have further noticed them than to have expressed our regret that three such distinguished chemists should have passed from us almost together. But we cannot so pass over one of them—a young man, only 28, accomplished and gifted, who ministered so much to our pleasure and profit at the last meeting, that I feel it is but our duty, as I am assured it is your wish to give expression to our feeling of deep regret at the loss of one who gave such earnest promise of being of great service to our profession and Association. Can I say anything higher or better of the late Mr. Thomas Wills than has been already recorded: "He was a good son and a faithful friend?"

Mr. David Hunter, of Greenwich, was many years the Superintendent of that station of the Phœnix Company. He made a laudable attempt, many years since, to establish a benevolent institution. In a letter to me in 1870 he said: "Some years since, I was anxious to bring the matter before the gas world, and cherished the thought that sooner or later it would be accomplished. Excuse me for not going into details; but, if all be well, I will be at the meeting, and I may then have an opportunity of explaining the object I have so long contemplated."

Mr. Hathaway was some years since Manager of a works in this neighbourhood—North Shields. He was a good practical manufacturing chemist, and at the time of his death was acting in this capacity.

The Gaslight and Coke Company lost the services of a most valuable and experienced officer by the death of Mr. Johnson, the able Outdoor Superintendent of the Company. Mr. Johnson passed through two most excellent schools—Liverpool and Leicester—to his high position at the Chartered. In the work of districting London, he rendered valuable service to the Company which he so faithfully and honourably served.

Mr. Edward White, of Birmingham, presided at our Dublin meeting, and delivered a most excellent address. He was Engineer to the Birmingham Gas Company for some years, and his gentlemanly bearing and genial manners endeared him to all his friends. He was ever ready to impart information, to give of his large experience, and to throw open his works to those who were in need of such assistance. Thus he earned the position which he so well filled—a Vice-Presidentship of our Association.

It will be most in harmony with the life and character of the late Mr. King to only briefly refer to his labours in our profession—his life's work. For nearly a quarter of a century he laboured in connection with the Journal of Gas Lighting. We are indebted to him for the faithful and satisfactory reports of our meetings, all of which, with the exception of the last, were written by himself; but we are still more indebted to him for a continuance of those favours of reporting and publishing, by which Mr. Barlow contributed so much to the success of this Association, which favours, I have great pleasure in informing you, are continued by Mr. Walter King. Nearly to the last, Mr. King's anxiety for our interests and the welfare of the Journal continued. Some time after our meeting, he wrote to me very despondingly. He said: "I have been a prisoner to the house, and almost entirely to my bed, for the last fortnight, and am still very weak. Sadly I begin to fancy my days of actual work are drawing to a close. I have had 35 years very hard work, and am pretty well used up." His last words to me were the expression of a hope that this year of our Association might be a prosperous one. You all know what a retiring disposition his was; but his friends know the thoroughness of his character and his strong sympathies. Another tie is severed which connected the present with the past of gas lighting. To the bereaved, we can but give an assurance of our very sincere sympathy.

To return to the muster-roll. The growth of our Association has exceeded the expectation of all its friends, and has been a matter of congratulation for every President. You will pardon me referring to my letter in the Journal of Gas Lighting for Aug. 25, 1863, which was the immediate cause of the formation of this Association; but it will let in a little light on the very earliest days of this movement, and will identify—which certainly will be gratifying to you all—our esteemed Secretary with the Association in embryo. The formation of this society previous to the publication of that letter was discussed several times very earnestly by the late Mr. Barlow, by Mr. Bennett, and myself; and though very sanguine hopes were entertained of its ultimate success, not one of us, I feel assured, had the remotest idea that in a few short years such a society would number nearly 700 members. You can measure this growth with that of another learned society. A few weeks since I read the report of the Annual Dinner of the Royal Institute of British Architects, and was surprised to find that though that society was founded upwards of forty years ago, it only numbers 750 members. This rapid growth of ours is indicative of great vitality. We are conscious, too, that our individual professional life has been raised by our higher associated life. The question, however, presents itself: Is our organization such as to conserve our energies, to raise to the highest the status of the individual, and to develop to the fullest our collective knowledge and experience?

For the purpose of such an inquiry, it is necessary to see what were the means for professional advancement of the gas engineer, and what was the position of the gas manager when this Association was founded, so as to ascertain what the objects of the founders were, what changes have since taken place, and what is our present position.

The year in which this Association was founded, strange to say, was the year of the jubilee of the first Gas Company that was established—the Chartered. That year, too, was the first in which the Company divided a 10 per cent. dividend. The Great Exhibition year brought forth the Polytechnic Exhibition of Gas Apparatus, under the auspices of the Gasfitters Association, through whose instrumentality some excellent lectures were given. A few years previous to this, a gathering of gas managers took place at the Adelaide Gallery, Charing Cross; but no attempt, I believe, was made to form them into an associated body, or to draw them at certain times together. This period, too, was one of great professional activity, and of considerable public agitation, the Great Central Gas Company having just been established. The highly-gifted Lewis Thompson (in whose native town, I believe, we are now assembled) was then labouring, as few have done, for the advancement of gas lighting, and was a constant contributor to the pages of the Journal of Gas Lighting. It was then, however, but a monthly publication, and another Exhibition—that of 1862—came, and found it but a bi-monthly, which it was at the time of the formation of this Association. The Journal, it may be said, was then our only means of communication, and "Clegg on the Manufacture of Coal Gas" the only professional work.

Dr. Frankland, in a lecture delivered at the Royal Institution in 1863, referred to the relative positions of men of science and manufacturers; and his remarks may, I think, be taken as descriptive of ourselves as a body at this time. "The man of science," he says, "rejoices in the discovery of truth for its own sake. He gives his results freely to the world. It is no part of his duty, it is not his function to apply those truths to the utilities of life. Success in this direction requires quite different powers of mind. Those who possess these powers ought also to acquire the knowledge which would enable them to seize upon the discoveries of science and apply them to the wants of every day. This is the link which, up to the present time, has so sadly failed in the application of science to the manufacturing arts." The founders of this Association desired, it may be said, to relieve us from such reproaches as this. Their object and aims

are set forth in our Rules, in the words in which they were first published:—"This Association shall devote itself to the encouragement and advancement of all matters connected with gas engineering, manufacture, and finance; being established to facilitate the exchange of information and ideas among its members." The Chairman brought out one of these ideas more prominently in his speech than it appears in the Rules—the social character of the Association. He said the meeting was for the purpose of discussing the desirability of forming a society or association for the purpose of affording an opportunity of more direct social intercourse amongst managers, engineers, and others directly or indirectly interested in the construction or management of gas-works; the result of such intercourse being the probable further development of all matters connected with the manufacture of gas; and in my letter, four months previous to this, I wrote: "What appears to me to be wanted is a general meeting of gas-men once a year, at which the leading subjects of interest to the gas trade might be discussed, not by set orations, but in a simple businesslike manner; and that any new discovery or invention might have publicity given to it, and the advantage of being seen in operation. Two days would be ample time for this, as well as for the renewal of old professional friendships, and the formation of new ones. The society might meet in different cities or towns each year." I need not say that these objects have been most faithfully carried out, and the results looked for have been more than realized.

Now as to the changes that have taken place since these simple objects were set forth in such an unpretentious manner. The movement has extended to foreign countries, and every large centre of our own country has become a nucleus for the formation of local associations, and many of our members are connected with them. Further, we are becoming associated with foreign societies, besides having our ordinary members in every part of the world. Under such circumstances, our position cannot have remained unchanged, though we have faithfully adhered to our constitution. The local societies, whether they appreciably influence us or not, have a position in the country, and a hold upon the profession which we alone held. That there has been no rivalry must be admitted, and also that the membership of the local does not prejudice the individual in the British Association.

We cannot but hope that we shall always remain in the present so far satisfactory condition, whether our relative positions remain unchanged or not. Assuming that nothing can arise to disturb the mutual respect we have for the labours of each other, and the good feeling that exists, it but clears the way for the inquiry to be made, with which I started: Is our organization adapted to develop to the fullest the collective knowledge and experience of the profession, and make available for the common good the opportunities for observation which the members possess? If this is not so, we do not take that high position as a profession which we should occupy, and fail, to this extent, in the application of science to the manufacturing arts. That we do occupy such a position, I think, can not be maintained; this, however, is no reflection upon the Association. By its action it was felt that its advantages required supplementing by local knowledge and local experience. Naturally, then, these local societies are the outgrowth of the other, and we have here, roughly shaped, perhaps, a model of an Association of fairer proportions, in which could be combined the general and the particular, theory and practice—facts from observation on which to base general laws, which would form a perfect whole—an Association that would elevate the profession to the position of which it is worthy.

The Scotch Associations, the North of England, Lancashire and Yorkshire, Midland, and West of England Associations, are all capable of having their several districts better defined than they are at present; indeed, the whole of the United Kingdom should be so divided, geologically, by the respective coal-fields. Our learned and esteemed friend, Mr. James Paterson, of Warrington, gives five important coal districts to England:—1, Newcastle and Durham; 2, Lancashire; 3, Yorkshire, Nottingham, and Derby; 4, South Staffordshire; 5, South Wales. Our raw material would then naturally divide the work of observation and inquiry, for the purposes of classification and comparison. The British and local Associations—or, if you will permit me to call them so, the head and its branches—would find their work equally well defined. The head would determine the inquiry and formulary necessary, and the branches would make the observations and returns; the whole would then be classified and compared. No great discovery might be made in the course of such work, but it would yield facts and figures, which would give us what we so much desire—reliable data. The three great branches of our manufacture—carbonization, condensation, and purification—processes effecting changes of the most subtle and complex character, if thus scientifically dealt with, would divulge Nature's infallible laws to guide us in our work; and so every matter in connection with that work might be dealt with. As a proof of the value of close and constant systematic observation in our manufacture, I refer you to "Patterson on Purification," of course without the least reference to the controverted questions. But how enlarged would be our powers of observation with every coal-field pressed into our service, and every gas-works a laboratory, with an ever-watchful observer recording day by day results for comparison and generalization. Official reports on new inventions and the working of patents, of course, would be eschewed; so that, without prejudice, without rivalry, without the least fear of such labours lessening the individual efforts to excel, this work could be pursued for the common good of a common calling.

In our report for 1873 will be found a paper by Mr. R. H. Jones, on "Gas-holder Capacity compared with Consumption," that will give a very good idea of the nature of the work and the manner of doing it. By referring to that paper, it will be seen how unobjectional such work may be, giving the individual the power to compare without being individually compared. In the report of the discussion on the paper, it will be found that, excellent as it, it just lacks the principle on which our returns as an associated institution would have been made—*locality*.

To become associated with the local societies, it will be necessary to alter our constitution; but there will be no difficulty, I think, in this, as the matter will rest with ourselves. We are nearly all local members now. Such changes need not deprive the local or branch associations of freedom of action in other matters than those prescribed by or affecting the whole of those associated. The local presidents would doubtless be chairmen of committees of the branches, and members of the councils of those associated for associated work. I need not pursue the matter further than this, to shadow forth the practical character of the changes suggested, and to show that by such we shall be brought more into harmony with the local associations. Such changes, I feel assured, are necessary to develop to the fullest our resources, and will rapidly and materially raise us as a profession.

A worthy member has directed the attention of the Committee to a change that it is desirable to make in the reports of our transactions—namely, by printing them in larger type. A further change is also desirable; but that is a change in constitution, and one of real importance, if we are to exercise an educational influence upon the profession.

"The Education of the Future Gas Manager" would have been, at any previous period of our history, an important subject; now it is a momentous one. Men of science are agitating the world with discoveries and inventions that may most seriously affect our interests, and try to the uttermost the resources of our profession. It is a matter of regret that those with whom we have daily to do, and who are associated with us in our practical work, are generally excluded from the advantages of our higher professional associated life. From these classes, too, some of our best men have sprung. Still, as an Association, we deny them any advantage of what should be our higher training and larger experience, and refuse to help them to that higher position to which they aspire, and for which they are striving. A position is now the qualification for membership, and we cannot, unless we alter the qualification, exercise a general control over the election of candidates. Placed in the position of manager, he is eligible for election, whatever his experience or capacity may be. Now, if our constitution were changed so as to admit Associates, and if from this class were elected, after giving proof of qualification, the Members, their position would rest on personal attainments, not on fortuitous circumstances. We could then exercise an educational influence upon them; then membership could precede an appointment, and be of real value to a candidate. I have not referred to pupils, but to meet their case, if for no other reason, our constitution should include the class of Associates. This matter has already been ventilated, and I trust that it will be dealt with in a formal manner at no distant date.

As I thus most earnestly impress upon you the necessity for the formation of a lower grade, so with equal earnestness do I recommend you to open the highest grade to our Ordinary Members—ordinary, I mean, by classification, but extra-ordinary by attainments. Not freely or unguardedly would I confer this honour, but give it only as a distinctive mark of the high appreciation in which any member might be held by the Association—to those only who distinguish themselves by great attainments, and who exercise their gifts in promoting the interests of our Association.

There has been no important changes in legislation affecting our interests during the past year. Companies do not appear to be losing confidence in the sliding scale. Four years since, the principle was adopted by the Commercial Company, and in the following year The Gas-light and Coke and the South Metropolitan Companies obtained powers for its adoption. "Precedents in Private Bill Legislation," by Mr. G. W. Stevenson—an exceedingly useful work to all, but almost invaluable to those about to go to Parliament—gives the following numbers for each year:—

Year.	Number of Gas Acts.	Number with Sliding Scale.
1875	19	1
1876	31	2
1877	35	14
1878	34	11
1879	38 (Bills).	9(?)

There has been unfortunately a departure from the principle on which the system is based—a standard price, and any departure from it, either for or against the consumer, to carry with it an advantage or a penalty. The standard price should be a fair average one, with a margin for fluctuations on both sides; not free from risk or liability, and open to advantages from low prices and improved work. The margin, however, should be the same on both sides of the standard; the penny up or down should carry with it the quarter per cent. So with the reserve and insurance funds there has been a departure from the principles laid down—that these funds are equivalents for advantages which companies possessed. For the Legislature to give us equivalents for advantages we possessed, and then for local bodies to interfere with such, is a course that cannot be justified. These principles certainly should either be accepted in their entirety or rejected.

It is to be regretted that gas companies have not a stronger combination than they possess for guarding their property, and repelling unjustifiable attacks upon their common rights. Their rights should be as zealously guarded as the duties of the companies are strictly enforced. With the many millions at stake in gas-works, every company should be in union with the Gas and Water Companies Association. With such a combination our interests could be well maintained, and with a good representative Committee that Association would benefit in every important movement. In Mr. W. Livesey, the Association have a most able and experienced Secretary, who has lately done excellent work in connection with the evidence given in favour of gas companies before the House of Commons Select Committee on Lighting by Electricity. The evidence given is most valuable, and its influence will doubtless be seen in the report of the Committee.

There is one point, however, to which it is my duty to refer—the action of the Gas and Water Companies Association in presenting the petition for withdrawing clauses taking powers to light by electricity. There are 38 Gas Bills, I believe, in Parliament this season, 34 of which seek powers for electric lighting. The advisers of these Companies, I think, could not have done otherwise than insert the clauses at a time of such excitement and anxiety as prevailed when these Bills were prepared. That the responsibility of the position was felt, may be seen in the fact that nearly the whole of the Bills contain the clauses. These Companies, or at least those who are subscribers to the Association, should have been consulted, it is felt, before the petition was published. In this matter I am not expressing my own opinion only, but those of others. One other matter I have to refer to in connection with the Gas and Water Companies Association is the non-publication of reports. If this were done, and the Association made a truly representative one, its action would be effectively felt.

With the most friendly feeling I refer to these matters, and with a great desire to see the Association exercise that influence in the affairs of companies which I believe it is capable of doing. I say in the affairs of companies, because in other than direct legislation a vigilant watchful care should be exercised. The necessity of this could not have been better seen than at present. There are four Bills in Parliament relating to employers liability for injuries to their servants; also one on noxious gases—both subjects affecting us, though scarcely coming within our ordinary sphere of observation. The latter Bill is very important to us. It includes sulphate and muriate of ammonia works, tar distilleries, gas-liquor works, and coke-ovens; but those ovens are excepted in which the coke made is a bye-product of the manufacture of gas. The works have to be registered and licensed, and unless "the owner of any work to which this part of this Act applies fails to use the best practicable means for the purposes for which he is by this part of this Act required to use the same, he shall be deemed to be guilty of an offence against this Act, and shall be subject to a penalty not exceeding, in the case of the first offence, twenty pounds, and in the case of a second offence, fifty pounds, with a further sum of two pounds for every day during which such offence has continued, and, in the case of a third or any subsequent offence, twenty pounds for every day during which such offence has continued."

The electric light, as a system, has been compared with gas lighting. Well, if it ever becomes what some of its most enthusiastic manipulators believe of it—that, in simple language, wires may be laid through a house in such a manner that in any part of the system a suitable light may be evolved—then a fair comparison can be made, and to the advantage of the

now light, perhaps. But that is not the system we now have fairly placed against ours. We run pipes through a building, and from any point in the system we *do* obtain light, of the smallest possible amount, or in quantity to rival the electric light; and we *do* obtain heat, of the most reliable and constant character, and of any temperature. Further, we *do* obtain power that may be used to drive machinery for works the most delicate, or may be made to store up power for the mighty forces of the hydraulic press. But to confine ourselves for a moment to the light only. What do we see? A small aperture, and nothing more, from which the gas issues, and evolves the light. Then place against this the most simple electric lamp, and what else have we but, for practical domestic purposes, a complex philosophical toy? In this matter I hope I shall not be misunderstood. I am speaking of things as fitted for practical every-day life, and so compare this light with our beautiful system.

Our esteemed Secretary has been practically engaged in the matter with one of our members—Mr. Valon, of Westgate-on-Sea. Their report was a very valuable contribution to the subject at a time when it was most required. Mr. Sugg has also been practically engaged on the subject, and I have no doubt will give us a most valuable paper. Indirectly, too, we have been benefited greatly by the inquiry that has taken place into this question, inasmuch as we have learned something on the law of opening ground, and the general powers of gas companies, in the evidence given by Mr. W. H. Michael, Q.C., before the Select Committee on Lighting by Electricity.

Let us, however, look at the relative positions of each commercially, when introduced in competition with the other general modes of artificial lighting. We will take 1814, the year of the visit of the Allied Sovereigns. About this time the price of gas per 1000 feet, *estimated quantity*, was 15s. Assuming that it would be 13-candle gas, we may apply Mr. Lewis Thompson's tables, which give 54½ lbs. of best dip candles as the equivalent of 1000 feet of gas—we will say 50 lbs. Now the contract price for candles, per dozen pounds, to the Royal Hospital, Greenwich, in 1814, was 14s. 6d.; to this we may well add a halfpenny per pound for the higher price to the ordinary consumer, which will make the price 1s. 8d. per pound; or, light for light, assuming the candles to be equal to those experimented on by Mr. Lewis Thompson, the prices of the two would stand thus:—Candles, 62s. 6d.; gas, 15s. At the commencement, then, of gas lighting, it was offered to the public at a reduction of 76 per cent. upon the cheapest mode of obtaining artificial light.

Compare this with the latest official report, that to the Metropolitan Board of Works by Sir Joseph Bazalgette and Mr. Keates; and the facts are again given by Mr. Keates in his evidence before the Select Committee on Lighting by Electricity. In his evidence, he says: "It is of no use to deal with the question of naked lights, because palpably a naked light could never be used; but the light in an opal globe is equal to 155 candles, and in a frosted globe it is equal to 265 candles. To produce a light of 155 candles with gas, with one of the large Sugg burners, about 48 feet of gas would be consumed; and to produce a light of 266 candles, about 83 feet of gas would be consumed. The cost of the 48 feet of gas would be about 2d. per hour, and the cost of the 83 feet would be about 3½d. per hour. I have already stated that the cost of the electric light is 5·73d. per hour, and this is now a comparison between these lights, light for light. The cost of gas equivalent to the electric light in the opal globe is 2d., and the cost of gas equivalent to the electric light in the frosted globe is 3½d." In the joint report it is said: "At present there are defects connected with it [the electric light] that must prevent its adoption as a general mode of lighting competing with gas." This, I need scarcely remind you, is from practical experience, and it is the result of a competitive test, after years of experience and experiment, by some of the most gifted men of the scientific world.

I have compared the relative costs of gas and candles at the commencement of gas lighting; but what was the cost of the raw material—coal—at that time? In the London market, in 1814, the price, deducting 12s. 6d. duty per imperial chaldron (25¼ cwt.), was 26s. 10d. per ton. In 1873, 59 years after, the price, deducting the duty of 1s. 1d. per ton, was 30s. 6d. per ton—14 per cent. higher than in 1814. But the price of gas had been reduced in London in 1873 to 4s.; or a reduction had been effected of 73 per cent. on the price alone, excluding the increased illuminating power.

London Market—Imports and Prices of Coal.

Duty Charged.	Year.	Total Imports. Chaldrons.	Price per Chaldron.	Price per Ton.*
8/-	1775	664,278	—	—
8/10	1785	734,286	—	—
9/3·3	1795	887,759	—	—
,,	1805	971,270	44/9	35/1
,,	1806	987,750	44/5	34/10
,,	1807	933,148	45/10	35/11½
,,	1808	1,085,050	49/3	38/7½
12/6	1809	923,440	54/6	42/9
,,	1810	1,120,237	51/8	40/6
,,	1811	1,115,171	47/8	37/4½
,,	1812	1,071,361	44/10	35/2
,,	1813	970,901	52/5	41/.
,,	1814	1,140,168	46/9	36/9
9/4	1815	1,117,034	41/8	32/8
,,	1816	1,214,405	40/4	31/8
,,	1817	1,137,891	39/10	31/3
,,	1818	1,202,541	41/10	32/10
,,	1819	1,179,544	42/11	33/8
,,	1820	1,313,736	43/8	34/3
,,	1821	1,270,270	46/3	36/3
,,	1822	1,254,031	41/8	32/8
,,	1823	1,425,662	41/-	32/2
6/.	1824	1,505,021	37/4	29/3
,,	1825	1,456,159	38/6	30/2
,,	1826	1,600,227	37/4	29/3
,,	1827	1,476,328	38/6	30/2
,,	1828	1,537,691	38/2	29/11
,,	1829	1,583,507	35/1	27/6
,,	1830	1,630,800	36/4	28/6
,,	1831	1,586,069	33/6	26/3

City duty of 1s. 1d. per ton imposed by Act 1st and 2nd William IV., cap. 76, and subsequent Acts.

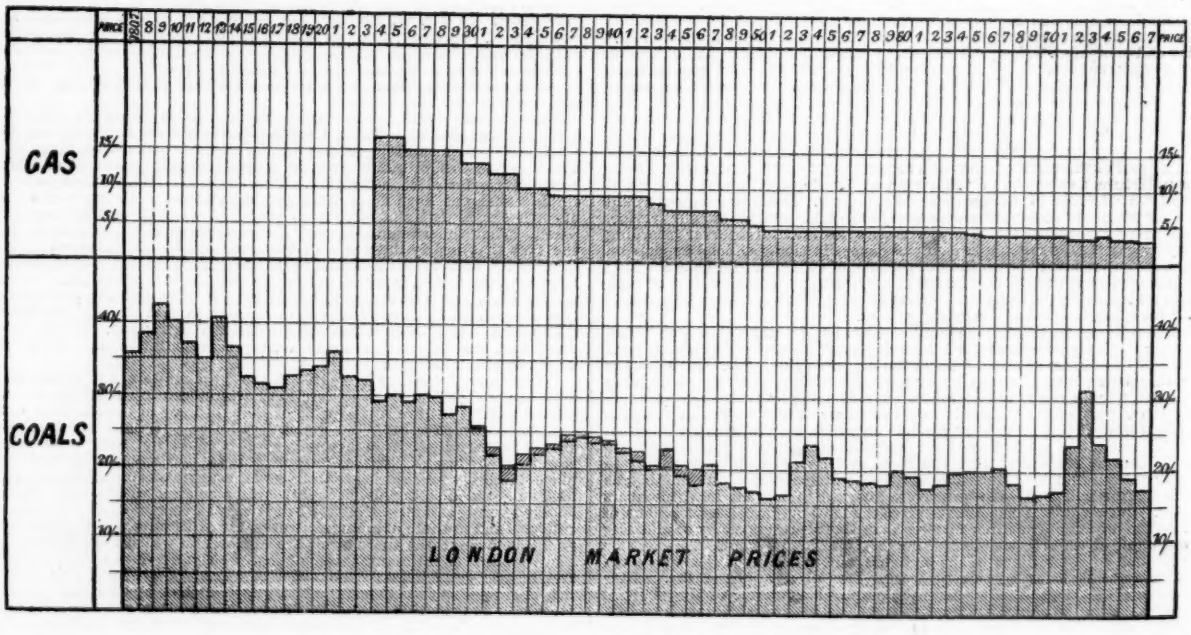
		Tons.		
—	1832	2,139,078	—	21/11
—	1833	2,010,409	—	18/3
—	1834	2,078,685	—	20/6
—	1835	2,298,812	—	21/11
—	1836	2,398,352	—	22/11

Year.	Total Imports. Tons.	Price per Ton.
1837	2,626,907	24/-
1838	2,581,085	24/6
1839	2,625,323	23/8
1840	2,566,899	23/7
1841	2,909,144	22/4
1842	2,723,200	21/2
1843	2,628,520	20/2
1844	2,563,165	22/10
1845	3,472,007	19/2
1846	2,987,325	17/11
1847	3,321,761	20/10
1848	3,476,146	18/2
1849	3,378,007	17/8
1850	3,637,878	17/1
1851	3,508,656	16/1
1852	3,742,248	16/6
1853	4,024,612	21/3
1854	4,376,771	23/9
1855	4,177,954	21/11
1856	4,391,584	18/11
1857	4,366,530	18/8
1858	4,477,191	18/5
1859	4,507,303	18/4
1860	5,070,515	20/1
1861	5,227,721	19/6
1862	4,967,349	17/7
1863	5,119,887	18/2
1864	5,468,045	20/1
1865	5,903,271	20/2
1866	6,013,265	20/1
1867	6,322,033	20/8
1868	5,970,090	16/7
1869	6,227,084	16/9
1870	6,769,007	17/-
1871	7,227,430	17/7
1872	7,556,423	23/10
1873	7,824,288	31/7
1874	7,423,488	24/3
1875	8,204,892	22/2
1876	8,451,376	19/7
1877	8,591,683	17/10
1878	Not published yet.	

* Calculated from Imperial chaldron of 25½ cwt.

London (Market) Average Price of Coal and the Imperial Company's Gas.

Dates.	Duties Paid.	Coal Imports.	Price per Ton.	Gas per 1000 Cubic Feet.
	Chaldron.	Tons.	£ s. d.	
Three years ending 1807	9/3·3	3,687,514	1 15 3	—
Ten ,, ,, 1817	12/6	13,891,964	1 16 9	—
Ten ,, ,, 1827	9/4	17,446,487	1 12 1	1824 / 1827 16/-
Ten ,, ,, 1837	6/0	21,633,368	1 4 2	11/10·8
Ten ,, ,, 1847	1/1 per ton.	28,378,429	1 1 7	8/1·2
Ten ,, ,, 1857		39,080,386	0 19 0	4/10·2
Ten ,, ,, 1867		53,076,580	0 19 4	4/4·5
Ten ,, ,, 1877		74,245,761	1 0 11	3/10·3



I must, however, direct your attention to the fact that the year 1873 was an exceptional one, the prices were abnormal; on the other hand, it is but due to our manufacture to show that the average of the last decade was not in the London market 1s. per ton above the three previous equal periods of time. Or, to take another comparison, the ten years ending 1877, the latest period up to which mining statistics have been published, the average price in the same market was 20s. 11d. against 21s.—the average of the fifty years from 1827. The prices, with the quantities imported into the London market for the whole period of gas lighting, I have the pleasure of placing before you in decades back from 1877.

The price of gas over the same period cannot fail to be equally interesting as valuable to you for comparison. This I have the satisfaction of placing before you. The prices are those of one of the earliest and largest, but now amalgamated Company of London—the Imperial, with its three stations, at Fulham, King's Cross, and Hackney. It was incorporated in 1821, and in 1824 the price charged was 17s. per 1000 feet, and

on its amalgamation with the Chartered the price was 3s. 9d. per 1000. The highest price charged by the Imperial was 2s. per 1000 above that ever charged by the Chartered, this being but 15s. in 1821, against 17s. of the Imperial.

These prices of the raw material—coal—and our staple—gas—when placed in juxtaposition, as in the diagram to which I have now the pleasure of referring you, form a title-deed on which we may rest our claim for a continuance of the privileges which we have won, and to which we may probably turn, when attacked with that malevolence which is engendered of ignorance and prejudice. The prices of the Imperial Company's gas may be taken as the London prices, and the coals of the London market from 1805. These prices have been checked, as far as means would permit, with the prices paid by the Imperial, and as far as compared, with the exception of the earliest years, which I have excluded, very nearly agree, as you will see by the diagram. Beyond this there is nothing to note in the diagram. The regular fall of the gas is remarkable when compared with the fluctuations and well-maintained averages of the coal. This subject is a very wide and important one, as it is to me a very interesting one; but I can scarcely enter into it much further. It may be that I have but just touched the subject; still it is sufficient to demonstrate that a regular and continuous reduction has been made in the price of gas, without any benefit from the lowering of the price of coal.

The question for us now to consider is whether this reduction can continue, and whether the average price of coal will remain constant. To the latter our friend Mr. Lebour may refer this evening; the former—whether the reduction will continue if the price of coal is not lowered—is a question from which we can scarcely escape at the present juncture. No one can fail to see the importance of the inquiry; for if we possess this power, we lessen materially the chances of competition.

To guide us, then, in forming a judgment upon this matter, we must inquire as to the cause of these reductions. Labour, we know, has retarded rather than accelerated reductions. The increase of wages has been a most serious matter, especially in districts such as those in which we are now gathered; nor has there been any reduction in staff or non-productive labour. The tendency here is to increase; closer inspection, more thorough supervision, and better organization, have added sensibly to the cost of management. But in this increased cost of management have we not the secret of our success? Our coals yield more per ton, we make more per mouthpiece, we lose considerably less in distribution, and economize products. We have, as an Association, assisted considerably in this work; and I have no doubt whatever that there is still room for improvement in the details of the great branches of our labour, even in the best-regulated works. We cannot, however, look for such results as we have already obtained to be greatly increased in the future. We are limited, therefore, in this respect, in our power to reduce the price of gas by—may I call it better management?

Dr. Ure, in his "Philosophy of Manufacture," says: "Manufacture is a word which, in the vicissitude of language, has come to signify the reverse of its intrinsic meaning, for it now denotes every extensive product of art which is made by machine, with little or no aid of the human hands; so that the most perfect manufacture is that which dispenses with manual labour." In this direction it is, in my judgment, that we are to look for the power to continue those reductions which so effectively show themselves on the diagram—by introducing machinery for the labour which is so costly, and so often unreliable. In this direction many gifted men have toiled, and with varying degrees of success. I say toiled, for those only who have laboured at the work know how great the difficulties are, and how discouraging are the fruits of their labours. Still, success will be achieved, I feel assured, and machinery will do the whole work of carbonizing. However, I do not confine my remarks to the carbonizing; I allude to the other work connected with our establishments—to purifying—to the breaking of cannel, which, I may say in passing, I have heard is most effectively and cheaply done by a machine of Mr. Hislop, of Hillhead; by the lifting of coal and coke and the filling of waggons, the latter of which, through the kindness of Mr. D. Swallow, of Bradford, I saw most effectively done; and generally to the introduction of all labour-saving machines.

Constructionally, then, we must look for an increase in the cost price by an augmented capital, but this will be more than balanced by the lessened charge of dividend to be paid on new capital, arising from the premiums paid on sales by auction. I look, however, for a still further augmentation of capital by increased cost of ground for extensions; by more substantial and a higher class of buildings, and by improved and better finished general plant, and a more carefully constructed and elaborate distributing plant. Works cannot be tolerated now that were constructed years since—without the least pretension to style, or even form or fitness for the purposes required; neither can pipes be laid without regard to their adaptability to disturbing causes, and their preservation from the deteriorating effect of the mixed nature of the soil in which they are placed. Nor can any part of the manufacture or supply be left to manual adjustment that can be automatically regulated. Further, there will be a more rapid growth of capital, which will have to be paid on by many companies coming under the more stringent regulations of the Gas-Works Clauses Act, 1871, on account of services and meters, which previously may have been carried to revenue.

Revenue, however, will gain considerably by most of these matters, and, perhaps, those items which will gain the most will be wear and tear and renewals. These in all balance-sheets are heavy items, if the works be well maintained. In the designing of works these items should be well borne in mind. The structures should be such as to prevent as far as possible any deteriorating effects from the work done within them. For example, take roofs of retort and purifying houses. These should be of a composite character—iron, wood, and tiles—and all parts of the principals should be easily accessible for painting. So of the machinery; it should be of ample capacity and power for the work to be done, and the plant, as far as possible, should be capable of enlargement.

The maintenance of works in a thoroughly efficient condition is of primary importance to a well-regulated company. I fear, however, unless well guarded against, there may be a tendency to sacrifice the true interests of the undertaking in this respect to the more pleasing, but then the more questionable advantage of the higher dividends from a reduction in price, which is given by the sliding scale, where in force.

For a continuous reduction in the price of gas, we must, however, look to an increasing daily consumption. This, without any alteration in the price of coal or labour, or mode of manufacture, will afford us the means of lowering the price, and will lessen our anxiety, by enabling us to keep a larger number of firemen on through the summer for the winter work. In this matter the consumer has a direct interest in increasing his consumption; the producer in giving him every facility for doing so. Apparatus for heating, cooking, and producing motive power should be lent on hire at such rents, or upon such terms, that the cost and maintenance may be just covered; the increased consumption should be the only thing desired.

The movement for exhibitions of gas cooking and heating apparatus has rapidly extended through the country, and is doing good work. Carlisle, Stockton, Birmingham, Bradford, Halifax, Leeds, and other places, have all had their exhibitions, which have been great successes. I feel we are greatly indebted to Mr. Robert Wallis, of Stocksfield, Chairman of the South Shields Gas Company, and his co-Directors, for the inauguration of this movement, which is destined to do such good work in furthering the object of an increased daily consumption. In looking at the subject from this point, simply as managers of commercial undertakings, we shall see nothing but the commercial element, nothing but price and profit. But, animated by better feelings, we shall see that our common calling can lessen the labours and cares of domestic life, can brighten the homes and truly minister to the comfort and happiness of the masses. Our business thus becomes a social question. To deal with this we must raise ourselves to our higher professional position, and then we shall become conscious of our wider responsibilities and deeper obligations—responsibilities extending to our Divine Master, and obligations to an advancing civilization.

Premiums for Papers.

The President announced that the following premiums had been awarded for papers read last year:—

1. Mr. George Livesey, for his paper on "Capital and Revenue."
2. Mr. John Methven, for his paper on "A New Standard for Determining the Illuminating Power of Gas."
3. Mr. Charles Hunt, for his paper on "Preventible Waste."
4. Mr. Thomas Travers, for his paper entitled, "Some of the Causes Tending to Retard the Application of Gas for Heating Purposes."

Scrutineers.

Messrs. C. Sellers (York) and Mr. D. Clarke (Ashton-under-Lyne) were appointed Scrutineers of the balloting papers for the election of the Officers of the Association for the ensuing year.

Reading of Papers and Communications.

The reading of papers was then commenced. As in previous years, we shall now merely mention the order in which the papers were read, reserving the publication of them, and the discussion thereon, for our next and following issues.

Mr. W. Cowan (Edinburgh) read a paper on "The Automatic Pressure Changer," a specimen of which was shown in action during the meeting.

Mr. T. Travers (Cork) read a paper entitled, "How can Gas Companies Best Promote the Application of Gas for Heating Purposes?"

Mr. W. Sugg (London) read a paper on "Lighting by Gas and Electricity."

Mr. W. Carr (Halifax) read a paper on "Gas-Engines."

Mr. C. Sellers (York) read a paper on "Coke: the Best Means of Utilizing it."

The President announced the receipt of the following telegram from Mr. J. O. N. Rutter, of Brighton:—"President, Officers, Associates, Visitors, these few words of hearty greeting. Kindest wishes for successful gathering. Practical gas lighting is of good age; the science still young. Let every one try to make his mark. Farewell."

At the evening meeting the chair was taken at half-past seven o'clock, when a lecture was delivered by G. A. Lebour, Esq., F.G.S., Professor of Geology in the University of Durham College of Physical Science Newcastle-upon-Tyne, on "Practical Notes on Coal and Coal Getting." A report of this will likewise, in due course, appear in the Journal.

Wednesday, June 11.

The chair was taken at ten o'clock, and the reading of papers was continued.

Mr. J. W. Sandeman (Newcastle-upon-Tyne) read a paper on "Economy in the Construction of Engineering Works."

Mr. W. Wright (late of Brighton) read a paper entitled, "Another Form of Cooler."

Mr. J. A. G. Ross (Newcastle-upon-Tyne) read a paper on "The Application of Hydraulic Machinery to Gas-Works."

Mr. F. W. Hartley (London), in the absence of Mr. E. Price, of Hampton Wick, read his paper on "The Lamplighter's Tell-Tale and Time-Keeper," the working of which was explained by Mr. Hartley by means of a specimen exhibited.

Mr. W. Foster, M.A., F.C.S., Professor of Chemistry at the Middlesex Hospital, submitted his paper on "The Estimation of Ammonia in Gas Liquor," and very successfully carried out an experiment on the mode of analysis described therein.

Mr. W. Carr (Halifax) read a paper, prepared by Mr. L. Monk, of Lanark, entitled "Notes on the Rapid Corrosion of Gasholders in Hot Climates."

Mr. F. W. Hartley, in substitution for a paper by Mr. J. Douglas, of Portsea, on "The Albo-Carbon Light," which there was not time to read, gave a short description of the method employed to produce the light. There were three forms of the Albo-Carbon Light Company's apparatus exhibited in action.

[There were also five other papers submitted, but, through want of time, they were taken as read, and ordered to be printed in the Transactions of the Association. They were: 1. "Protective Paints for Gasholders," by Mr. J. Douglas, of Portsea; 2. "A New Form of Condenser," by Mr. J. Douglas, of Portsea; 3. "Economy in Raising Steam in Connection with Gas-Works," by Mr. F. M. Harris, of Falmouth; 4. "The Gas Supply-Pipe beyond the Consumer's Meter," by Mr. N. H. Humphrys, of Westbury; and 5. "Hydraulic *v.* Faced Valves for Purifiers," by Mr. J. Thomas, of Bodmin.]

Election of Officers.

The Secretary stated that the report of the Scrutineers showed that the following gentlemen had been appointed Officers of the Association for the ensuing year:—

President.—Mr. John Douglas.

Vice-Presidents.—Mr. Charles Hunt, of Birmingham; Mr. George Wilson Stevenson, of London; and Mr. R. O. Paterson, of Cheltenham.

Committee (to replace those retiring by rotation).—Mr. Thomas Newbigging, of Manchester; Mr. Robert Hunter, of Stalybridge; and Mr. Samuel Brothers Darwin, of Portsea.

Treasurer.—Mr. H. Newall.

Secretary.—Mr. W. H. Bennett.

Finance Committee.—Mr. George Livesey, Mr. James Eldridge, and Mr. Corbet Woodall.

Auditors.—Mr. Alfred Williams and Mr. Alfred Lass.

Members in Arrear.

The Secretary read the names of those whose subscriptions had been more than two years in arrear, and they were struck off the roll of members, with the exception of two, which, on the motion of the President, were, under Rule 37, ordered to be retained for another year.

Election of an Honorary Member.

The President said there was a gentleman whom, he thought, it would be well to remove from the list of Ordinary Members, and put him on the list of Honorary Members—namely, Mr. George Livesey. He had very

greatly contributed to the success of the Association, and he begged to propose that he be elected an Honorary Member.

This was unanimously agreed to.

QUALIFICATION FOR MEMBERSHIP.

In reference to the applications for membership, some of which, as previously stated, were submitted on this second day of the meeting,

Mr. HUNTER (Salford) asked if two of the gentlemen on the list were qualified for membership.

The SECRETARY said he could not tell more than was stated on the proposal form.

Mr. HUNTER said this question had often been discussed, and he thought it very desirable that there should be some definite decision arrived at. He did not understand why he could not propose for membership some ten or twelve of his own assistants. He had always understood that, to be members, persons must be engineers, managers, or secretaries of gas-works; but if it was understood that any assistants, who in large works might be numbered by the half-dozen, could become members, he perfectly agreed to it. All he said was that if assistant-managers were to be elected, he should claim the same privilege for some of his assistants. One of the names he recognized as having been before the Committee on more than one previous occasion.

The PRESIDENT thought Mr. Hunter would understand that it was very difficult indeed to draw a hard-and-fast line between one man and another. Surely a man in the position of outdoor superintendent over a large district was better qualified for the management of ordinary-sized works, than a man who only had small works under his charge. It was very difficult to deal with this question, and he could not see how it could be settled in any other way than by adopting, as soon as possible, the suggestion he had thrown out on the previous morning, of forming a class of Associates; otherwise, they must either exclude from their ranks many useful and valuable men, or else strain one of the rules to admit them. He did not think there was any difference between the gentlemen now proposed and some who had been elected on former occasions.

Mr. ELDRIDGE (Richmond) said for two or three years he had proposed as a member a young man whom he considered far more eligible than some of those on the present list, but he had been refused. He was very glad that Mr. Hunter had raised the question.

Mr. HUNTER said he quite agreed with what the President had said, and if all the gentlemen had the qualification named, he would not raise the slightest objection; but he did not think that was the case in one instance, at any rate.

The PRESIDENT said the Committee had had an assurance from his proposer that the gentleman referred to did fill an independent position, and that was the reason the Committee had put him forward as an approved candidate.

Mr. HUNTER said if the qualification for membership was to be that a man was fit to take the position of manager, and he was to become a member before taking that position, he was quite willing to agree to it, as long as it was generally understood.

The PRESIDENT said that raised the question of a change in the constitution of the Association, which it would be impossible to discuss at that time. He thought the better way would be to exclude the three gentlemen to whom objection had been taken, and put the others to the vote.

Mr. CARR (Halifax) said the Committee had been placed in a most difficult position with regard to these names. They had gone very carefully into the matter, and submitted them to the meeting, although not feeling that they were on perfectly firm ground, but still being of opinion that the balance of evidence was in favour of the course they had pursued. It would be a very anomalous thing, for example, to decline to receive the Assistant-Engineer of the Beckton Gas-Works, whilst they might have a man as a member who was manager and secretary of a gas-works, and did his own stoking, and who would be perfectly eligible according to the rules. The rules further stated that exception might be made at the discretion of the Committee, and the Committee felt, in passing these nominations, that if members had been elected who were assistants, as was the case, they had no justifiable ground for declining to receive the nomination of these gentlemen. The Committee were not prejudiced in any way, and personally he did not feel interested; but he believed the Committee had endeavoured to do what was best for the Association.

After some further discussion, the whole of the gentlemen were elected *nem. con.*

PLACE OF MEETING NEXT YEAR.

The PRESIDENT said it was a principle with the Association to meet alternate years in London.

Mr. LONGWORTH (Guildford) thought there was no rule to that effect, and he would propose that they should go to Brighton, as they had been to London so many times.

The PRESIDENT said they might make their excursion to Brighton, which perhaps would meet Mr. Longworth's views.

It was then unanimously resolved to meet in London next year.

VOTES OF THANKS.

The PRESIDENT said he believed the papers read on that occasion had been quite as interesting as those presented at any former meeting, and he had much pleasure in proposing a hearty vote of thanks to the readers.

Mr. HUNT (Birmingham) seconded the resolution, which was carried unanimously.

Mr. F. W. HARTLEY said the Committee had had very arduous work to perform, but they had got through it satisfactorily, and he begged to propose a cordial vote of thanks to the members of it.

Mr. HUNTER said, as a late member of the Committee, he could bear testimony to the labours those gentlemen had to perform, and had great pleasure in seconding the proposition.

The resolution was carried unanimously.

Mr. HUNTER said he had another vote of thanks to propose, to a gentleman whom they all respected very highly, although they did not often see him. He had the privilege of knowing him personally, and he believed he had occupied the office he held ever since the Association was formed, which could not be said of any other official. He begged to propose a vote of thanks to the Treasurer, Mr. Henry Newall.

Mr. LONGWORTH seconded the resolution, which was carried unanimously.

Mr. CARR then proposed a vote of thanks to the Scrutineers. He said it was no slight task to have to go through the whole of the voting papers, and Messrs. Sellers and Clarke were entitled to their thanks.

Mr. SMITH (Hyde) seconded the resolution, which was also carried unanimously.

Mr. SELLERS, in returning thanks, said gentlemen sometimes obtained an office through the kind efforts of their friends, and were under a great obligation to them for it; but he certainly did not feel under much obligation to Mr. Carr for putting him into the office of Scrutineer, and he hoped he would not do it again. It was not an office which the most ambitious man would wish to occupy twice. He undertook the duty simply to expedite business, and he could assure the members that the duties had been faithfully executed.

Mr. CLARKE having also briefly responded,

Mr. COX (Sunderland) proposed a vote of thanks to the Auditors, Messrs. Hersee and Lass.

The resolution was seconded by Mr. ELDRIDGE, and carried unanimously.

The PRESIDENT said the Association had on this occasion occupied one of the nicest halls in which they had transacted their business when out of London, and further than that they had had every kindness shown them by the Society whose room had been placed at their disposal, and by the Librarian, Mr. Lyall. He must beg, therefore, to propose a vote of thanks to the Philosophical Institute and to Mr. Lyall.

Mr. HUNT seconded the resolution, which was carried.

A vote of thanks having, on the motion of the PRESIDENT, seconded by Mr. C. W. HASTINGS, been accorded to Mr. King, for furnishing the report of the proceedings for the use of the Association,

Mr. J. PATERSON (Warrington) moved a vote of thanks to the President for the manner in which he had fulfilled the duties of the chairman. He said the members must all feel much indebted to Mr. Warner for the very able and excellent address he had delivered. He was most happy in bringing forward ideas based upon first principles, and that was what they should all aim at.

Mr. TRAVERS (Cork) seconded the resolution.

Mr. HUNT said he had much pleasure in supporting the motion. He was sure they had all listened with infinite pleasure to the President's address, and he knew it would be read with renewed pleasure. In his address Mr. Warner had thrown out hints as to the future management of the Association, which were invaluable, and he trusted that the subject would come before the members on a future occasion for decision.

The resolution was put by Mr. Paterson, and carried unanimously.

The PRESIDENT said that on such occasions one always had a difficulty in finding words to express one's feelings. He had tried to do what he could for the interests of those amongst whom his lot was cast, although not so successfully as he could wish. He felt his shortcomings, but yet, so far as light was given to him, he had endeavoured to serve the Association, and to maintain the dignity of the Institution. He could only thank the members most heartily for the kind way in which they had supported him during his year of office. Every President must feel that he came into office inexperienced, and therefore had to rely to a great extent on the Permanent Secretary, Mr. Bennett. That gentleman had served the Association well, and the least they could do was to accord him a very hearty vote of thanks, which he begged to propose.

Mr. R. O. PATERSON (Cheltenham) seconded the resolution, which he felt would be received most heartily. In Mr. Bennett they had a most energetic Secretary, whose earnest efforts were devoted at each annual meeting to promote the happiness and comfort of all.

The resolution having been carried by acclamation,

The SECRETARY thanked the members for the kind way in which the resolution had been received. Whatever capabilities he might have for promoting the success of the meetings, he felt quite incompetent to return thanks in an adequate manner for their kindness, or to express his appreciation of the eulogium which they had been pleased to pass upon him.

This being the whole of the general business, the meeting was brought to a close.

DINNER.

In the evening the members, to the number of about 200, dined together at the Assembly Rooms, the chair being taken by the President, the vice-chairs by Messrs. R. O. Paterson, of Cheltenham, and Charles Hunt, of Birmingham. The toasts of "Success to the British Association of Gas Managers," "The Town and Trade of Newcastle," "The President-Elect, Mr. J. Douglas," "Past-Presidents of the Association," "The Committee," and several others, were given; and a very pleasant evening was spent.

THURSDAY, JUNE 12.

By invitation of the North of England District Association of Gas Managers, the Association visited Alnwick Castle, one of the seats of the Duke of Northumberland. Unfortunately, the weather was anything but propitious, and somewhat marred the enjoyment of viewing the splendid grounds and surroundings of the castle. A dinner was afterwards served in the Corn Exchange, Alnwick, which afforded much gratification, the members generally being extremely pleased at the hospitality displayed towards them.

FRIDAY, JUNE 13.

Again by invitation of the North of England Association, the members went by steamer to visit the Elswick Engine and Ordnance Works of Sir W. G. Armstrong and Co., the hydraulic machinery of the Swing Bridge, and the Redheugh and Elswick works of the Newcastle and Gateshead Gas Company. The steamboat, carrying about 300 of the members and their friends, left the Tyne General Ferry Company's landing-stage at nine o'clock in the morning, and, after allowing time to visit the various works, arrived at Tynemouth a little before three o'clock in the afternoon. Here another magnificent banquet was served, at which Alderman Hedley, Chairman of the Newcastle and Gateshead Gas Company, presided; the vice-chairs being occupied by Mr. J. Hepworth, of Carlisle, and Mr. T. Trewhitt, of West Hartlepool. The toast of "The British Association of Gas Managers" was proposed by Mr. J. Hepworth, and responded to by Mr. W. J. Warner; while that of "The North of England Association of Gas Managers" was proposed by Mr. H. Woodall, of Leeds, and replied to by Mr. W. Ford, of Stockton-on-Tees, and Mr. W. Hardie, of Newcastle-upon-Tyne, the President and Secretary of the Association. Mr. Warner then proposed the health of the Chairman, and, after several other toasts had been duly honoured, the proceedings terminated.

So ended what may truly be looked upon as one of the most successful of the meetings of the Association out of London; and not a little of that success must be credited to the exertions made by the North of England Association, assisted by various local gentlemen, to afford a really splendid entertainment for the two concluding days of the Association meeting in Newcastle-upon-Tyne.

SOCIETY OF ENGINEERS.—At a meeting of this Society on the 9th inst., in the Society's hall, Victoria Street, Westminster—Mr. R. P. Spice, President, in the chair—a paper was read by Mr. C. J. Alford on "The Mineralogy of the Island of Sardinia." After briefly describing the principal physical and geological features of the island, he proceeded to give an account of the several mining districts, or groups of mines, particularly alluding to the well-known mines of Monteponi, Gonnesa, Montevecchio, and San Leone, and, in conclusion, he minutely described the coal or lignite deposits in the valley of Gonnesa, and in the high regions of Seui, with the explorations which had been carried out in them by himself and others, giving statistics as to the relative value of Sardinian tertiary coal compared with true coal as a gas producer, and as a furnace and steam coal.

SOUTHWARK AND VAUXHALL WATER COMPANY.

The Half-Yearly General Meeting of this Company was held at the Offices, Sumner Street, Southwark, on Thursday, the 12th inst.—Alderman H. E. KNIGHT in the chair.

The notice convening the meeting having been taken as read,

The SECRETARY (Mr. Alfred Jelley) read the minutes of the last meeting, which were approved, and the following report and statement of accounts, which had been previously circulated among the Proprietors, were taken as read:—

Your Directors have the satisfaction to report favourably of the improved condition and prospects of the Company.

The half-yearly accounts of the Company to March 31, 1879, are forwarded herewith, the same having been duly certified by the public Auditor appointed by the Local Government Board, and by the Auditors of the Company.

Several Bills which have been brought before Parliament, affecting the interests of the Company, have received the anxious consideration of your Directors, and they have to inform you that the Bill referred to in their report of last half year, promoted by the Metropolitan Board of Works, for purchasing the existing interests of the Water Companies, not having met with the support of the Government, was withdrawn.

A Bill, intituled "The Lower Thames Valley Main Sewerage Bill," was also introduced, which your Directors believing to be detrimental to the Company, was opposed jointly with other Water Companies. This Bill was refused a second reading by the House of Commons.

It having been found necessary to overhaul some of the engines at Battersea and Hampton, with the view of putting them in efficient repair, tenders were invited from several leading firms, and, after a careful comparison, your Directors resolved to accept the lowest, being that of Messrs. Watt and Co.

Your Directors have to report that 7688 yards of new mains have been laid during the past half year, of which 290 are outside the Company's parliamentary district.

One thousand two hundred and twenty-four houses have been brought into charge in the half year ended the 31st of March.

In pursuance of his intention, as stated at the last half-yearly general meeting, Henry Whiting, Esq., has retired from the chairmanship of the Company, and your Directors have unanimously appointed Alderman Knight as his successor.

Major-General Lothian Nicholson having recently been appointed Lieut.-Governor of Jersey, and, in consequence, finding it impossible to adequately discharge his duties as a Director, resigned his seat at the Board, and in pursuance of the powers conferred upon your Directors, they have appointed Richard Henry Wyatt, Esq., of Parliament Street, to be a Member of the Court for the time yet unexpired of the period for which Major-General Lothian Nicholson, R.E., C.B., was elected.

Your Directors regret to announce the decease of John Tufnell Carbonell, Esq., for upwards of 20 years a Director of the Company, and they have appointed Vincent Biscoe Tritton, Esq., to be a Member of the Court for the time yet unexpired for which Mr. Carbonell was elected.

Mr. R. W. Sherrard, who has satisfactorily performed his duties as a Collector in the service of the Company for upwards of 20 years, has tendered his resignation, which your Directors have accepted, and propose, with the sanction of the Shareholders, to grant him a gratuity of £225.

A circular was issued on the 14th of February last to the Shareholders of the 1700 £100 five per cent. preference shares of the Company, convertible at option, on the 31st of March last, into the ordinary stock of the Company, and, in reply thereto, 13 Shareholders, holding 55 of such shares, have availed themselves of this option.

Your Directors recommend that a half year's dividend, at the rate of 5 per cent. per annum on the ordinary stock and class D shares of the Company, and 5 per cent. per annum on the preference stock and preference shares of the Company, be declared, payable on and after the 15th day of July next.

Dr.—REVENUE ACCOUNT, FOR THE HALF YEAR ENDED MARCH 31, 1879.

			Maintenance.				
To Maintenance and repair of impounding and service reservoirs, filtering-beds, works, and pipes, or for obtaining and storing of water, including the cost of materials and labour				£239	17	11	
Maintenance and repair of mains, pipes, fittings, meters, and works connected with distribution of water, including the cost of materials, labour, and renewals	£5,470	0	8				
Repairs of engines, &c., at the several works, included in Messrs. Harvey's accounts	4,000	0	0				
				9,470	0	8	
Pumping and engine charges, including the cost of coals, wages, &c.				10,667	0	9	
Filtration, including cost of materials and labour				1,810	0	3	
Salaries of Engineer, Superintendent, and Clerks, and wages of Inspectors and Turncocks				3,795	8	4	
Rents				27	12	8	
Thames Conservancy				1,000	0	0	
Rates and taxes				4,226	19	9	
							£30,735 0 4
			Management.				
Allowance to Directors				£510	8	4	
Allowance to Company's Auditors				21	8	9	
Salaries of Secretary, Accountant, and Office Clerks				1,173	19	11	
Superannuation				220	0	0	
Commission to Collectors				2,192	19	9	
Stationery, printing, and general establishment charges				571	1	5	
Law and parliamentary expenses				857	8	9	
Official Auditor and Water Examiner				92	16	1	
							5,640 3 3
Dividend and interest account for transfer of profits							49,029 10 2
Balance carried to next account, to provide for losses							4,000 0 0
							£89,404 13 9

Cr.—REVENUE ACCOUNT.

By Balance brought from last account	£4,000	0	0				
Surcharges on water-rental to Sept. 30, 1878	5,659	5	7				
				£9,659	5	7	
Less allowances for empty houses	£1,805	16	6				
Ditto overcharges	2,321	13	6				
Ditto bad debts	1,456	0	8				
				5,583	10	8	
							£4,075 14 11
Water-rents accrued to the date of this account							85,194 1 5
Rents received							116 17 5
Registration and transfer fees							18 0 0
							£89,404 13 9

The CHAIRMAN: Gentlemen, having thus disposed of the formal business, it now becomes my duty to move the reception of this report, and your approval of it; and I cannot but feel very great pleasure, the first time I am called upon to meet you as Chairman of your undertaking, at being able to congratulate you on the very substantial improvement which has occurred in the property we hold, since we last met. The Directors have given unremitting and earnest attention, during the past six months, to everything connected with the undertaking, and I can assure you that the bringing about of the satisfactory result to which I have referred has not been obtained except by the constant attention and supervision of your Directors, aided most efficiently and energetically by the Officers. The success of your undertaking mainly depends on your Directors continuing to throw a large amount of energy and attention into the business of conducting your affairs. Now, arduous as our duties are, I am sorry to say—I have not experienced it in other companies—that many difficulties are thrown in our way by what we may call some few of our own partners—not partners who hold any large number of shares, but who appear to have bought one or two for the express purpose of throwing difficulties in the way of the Directors. Now I do not know what term you would apply to a man who enters into partnership with a number of his fellows to a very small extent with such an object in view—raising these questions and difficulties, regardless of what may be the result to the widows and orphans who invest their little all in such undertakings as these. However, such difficulties are met by the Directors in the coolest and quietest spirit. We do our duty in these circumstances, and we have the satisfaction of stating that, though these difficulties do arise, from the manner in which they are met they are powerless to affect the undertaking. It will now become my duty to refer in detail not only to the report, but also to the accounts, and in doing so I shall go through the report *seriatim*. I have already made what remarks I think necessary on the first paragraph, and I will therefore now go to the second paragraph, which refers to the half-yearly accounts of the Company. Now, gentlemen, it necessarily follows that I should at once deal with the half-yearly accounts of the Company, and explain them to you as far as I possibly can, dealing with those items in the accounts which appear to me to show a difference, or palpable differences, that require explanation, between the accounts of the corresponding and the previous half years, and then continue with the rest of the report. If you take the statement of accounts, and refer to the statement of stock, share, and loan capital, there is no item whatever that calls for a remark from me in that account, the variations being so small, except in the amount of bonds authorized by 8 & 9 Vict., 1845, which now stand at £14,500, and the debenture stock authorized by the same Act, which stands at £104,950. Now, in March, 1878, these amounts stood at £52,000 and £67,000 respectively, and going back to March, 1877, they stood at £87,000 and £33,000 respectively. The reason of the great decrease in the bonds is because your Directors have been able to pay off those bonds standing at 4½ and 5 per cent., and they have been able to increase by so much the debenture stock at 4 per cent. Consequently we have effected a saving of one per cent., or one-half per cent. in that large amount. I will deal now with the capital account, and, taking the debtor side, I call your attention to the item of £559 3s. 6d. You see for what purpose that has been expended by the printing on the left-hand corner of the account. That item in the corresponding period of 1878 was £3627, and in 1877 it was £2000 odd. The great decrease there is because, as we told you at the last meeting, we had succeeded in the whole of the works of repairing and re-making the filters. Hence the great reduction from £3627 to £559. The next item is main and service pipes and the distribution of water—£4736, against £1964 in March last year; and you will say, "How do you account for that very great increase?" The explanation of that is of the most satisfactory character. This amount of £4736 includes the expense of laying a new main—an extra main—under the Thames at Richmond, which has enabled us to treble our source of supply under the river, and in the event of any accident happening to our main, we have an extra main there. We also get the supply of water to London more quickly, and are enabled to give a better supply to our customers. In referring to the laying of a main, I may say that it has not been done on the principle generally adopted in this country; it has not been laid on the old-fashioned plan. Our Engineer knew that it could be done in a different manner, and, staking his reputation on the work, he laid the main on the ball-and-socket principle, without any coffer-dam at all, and thus saved you something like £7000. The pipe has been working now for about seven or eight months perfectly successfully, and has performed its duty in every possible respect. The only other item I need refer to in that account is at the bottom—"Excess of income received over payments, £18,000." That means that we have reduced that excess to that amount, from something like £40,000 or £50,000 when I first came on the Board. It is money borrowed from capital account for the payment of dividends, and we have now repaid that within £18,000, and we fully expect that in the course of two or three half years the whole of it will have been repaid to capital, and then your accounts will, in that respect, be placed in the position in which they ought to be. If you take the other side of the accounts, the only items I shall refer to are those of mortgage, capital, and debenture stock, which stand respectively at £14,500 against £52,000 last year, and £416,000 against £375,000 in the corresponding period of last year. That is explained in the same manner as I have mentioned in the capital account, because we have paid off mortgages bearing 4½ and 5 per cent. interest, and increased the debenture stock, bearing 4 per cent. Now we will take the revenue account. The first item on the debtor side is £237, while in March, 1878, that item was £1860. The decrease there is thus accounted for: This time last year we had to pay Messrs. Hiscocks a very large amount for repairing and re-making filters. The next two items represent £9470. Out of that, £4000 is, as you know, the sum we debit revenue account with every half year on account of Messrs. Harvey's old debt, and, consequently, the variation is in the £5470, the amount of the first of these two items. However, we will deal with the total—£9470 this year, against £7834 in March, 1878. This increase is accounted for in this way. In addition to the ordinary affairs that come along in the working of our business, it is periodically absolutely necessary to overhaul your plant and engines, in order that they may be taken to pieces and put in efficient and working condition. This year the Engineer reported that this was necessary, and your Directors accordingly entered into a contract for the work to be done. It was accepted by Messrs. Watt and Co., and they have carried out the work to the satisfaction of the Engineers. That accounts for £1000 of the increase. The other portion of the increase is to be attributed to the very severe winter we have had, necessitating our having for some months to keep stand-pipes throughout the whole of our district. That entailed such expense that, in conjunction with other charges, it accounts for the increase in this item. The next item is £10,667, which in the corresponding period of last year was £9970. The increase here is not large, and it can be satisfactorily accounted for in two or three items. Included in that is the amount we had to pay to the Post-Office for placing all our stations in telegraphic communication, so that in case of fire we can notify the fact to the whole district. It also includes many matters for engine repairs not included in Messrs. Watt's account, and there is also some increase in coal. This very satisfactorily accounts for this increase. The next items are so nearly the same as before that it is unnecessary to remark on them till we come to Thames Conservancy, which is £1000, against £500 last year. That is simply because the Conservators obtained an Act of Parliament, and we have to pay them £500 extra. Coming to the management, the first item is "Allowance to the Directors, £510." In that respect your Directors have no control. It is an amount fixed by you, and we have no intention of charging you with extravagance. Then, in the salaries of Secretary, Accountant, and Office Clerks, the amount is £1173, against £1005 in the corresponding period of last year. That is accounted for partly by the Supervisor's salary, and I can assure you that that is a salary which we pay with the greatest pleasure, because it is from the institution of that office, and from the greater regularity which is brought to bear on the examination of money rightly due to the Company, that we have been considerably aided in improving your position. The item of commission to collectors has increased from £1700 last year to £2192 this year. That is accounted for by the increase of the rates collected. An increase in the amount collected

necessarily brings an increased amount of commission, and also accounts, in part, for the payment in the Supervisor's office for services in the revision of the accounts. I need scarcely allude to any other items on that side till I come to "Law and parliamentary expenses, £857." That is against £268 in the corresponding period of last year, and £1198 in March, 1877. These legal expenses are mainly the costs of the action against Messrs. Quick. Those costs, as you know perfectly well, were inherited, and we have had to pay them; but had it not been for those costs, I think your legal expenses this half year would have been under £200. Most of these legal expenses have been incurred in defending what I may call annoying actions brought by the class of persons I have referred to, or by small consumers in the district, who seem to take a delight in giving the Company trouble. In all cases I believe that we have been successful, the defects complained of being proved to be owing to the complainants' own defective fittings. The next item I shall refer to is the dividend and interest account for transfer of profits, £49,000. I think that £49,000 is a matter on which I can well congratulate you. It is a vast improvement on last year, when the amount was £39,000; and the year before it was only £35,000 odd. I think that the amount speaks for itself. You see that in managing your affairs we have obtained this result, which I hope you will consider satisfactory. I now go to the credit side of the revenue account. The first item you find there is £5583, allowances for empty houses, overcharges, and bad debts. That is a very considerable increase upon the corresponding items this time last year, when the amount was £2356. This increase is easily accounted for. In the last half year we had certain defalcations from some of our collectors, and as regards the meter account especially, we were unable then to judge what was the amount of the bad debts on that account, because we did not know that these collectors might not have received a large sum; so, in order to be on the safe side, we took the whole of these arrears as good debts. Therefore, in this half year we have to take in two half years bad debts on the meter account, instead of one half year. That accounts for a very considerable portion of that increase, and then having increased your water-rate charges from £72,000 in 1877 to £85,000 now, it necessarily follows there must be a proportion of bad debts on that increase of your rental. Then, again, there is a further amount of the increase in the bad debts on the water-rates taken into charge for new supplies, where we charged for the entire half year; but when we came to collect the money it was found that the occupiers had been in only one or two months, so that we had to credit them with four or five months. The next item is the water-rents accrued to the date of this account, £85,000, against £79,000 in 1878, and £72,000 in 1877. I do not want you to think that all this increase is accounted for by having increased the rates in the district. That is a mistaken notion, and one which it is my duty as Chairman to explain to you. A great portion of this increase has been obtained from new houses in your district. We have revised your rates, but have not increased them to the ordinary consumers. Where the great increase of rates has been made has been mostly with large consumers, who were paying very considerably less for the water they were taking than they ought to, and who have acknowledged the justice of the increase by accepting and paying it, and by, in many cases, thanking the collectors for the liberality with which we have revised their charges. On the next account, the dividend and interest account, on the debtor side I have nothing whatever to draw your attention to, except the last item, "Balance applicable to dividend, £37,806." This time last year my predecessor told you that you had £17,758, and in 1877 we had £17,400; so I think we may congratulate you in offering you £20,000 more for dividend as the result of the half year's working than in the corresponding period of the two previous years. Taking the creditor side of the account, the first item is £11,082. That represents the balance which your Directors carried forward last half year to the credit of dividend account, and that compares with the £564 carried forward in March, 1878. So you see that in March, 1878, we paid you at the rate of 3 per cent., and took over £564, while last half year we paid you at the rate of 4 per cent., and carried forward £11,000. Then, to come to the last item on that side of that account, "Revenue account for profits transferred," the amount, you see, is £49,000, as against £39,400 in March, 1878, and £35,620 in 1877. The last account is the statement of the liabilities and assets. Taking the liability side of the account, I do not know of anything to which I need call your attention, except the item of outstanding tradesmen's accounts, &c., owing by the Company—£11,000 this half year, as against £15,000 in the corresponding period of 1878, and £16,000 in March, 1877; so you see your Directors are now able to pay better than they used to do. We hope by paying closer that we may buy cheaper, and we have in contemplation a system of paying monthly instead of quarterly, by which we hope to save you 2½ per cent. on all accounts paid in that manner. Going to the asset side of the account, the first item is water-rates and service account due to the Company £79,255, against £74,500 in the corresponding period of last year, and £72,000 in the same period of 1877; showing the same satisfactory increase. Then comes "Water-rates in the hands of collectors for collection, £4355." This item requires some explanation, for it compares with £2625 in the corresponding period last year. This is accounted for to a great extent by the state of the meter account. They are believed to be good arrears, and we are collecting them as fast as we can. But, in the case of two of our districts, we found that the collectors, when we came to examine their accounts at the end of last half year, were not so close up in their collections as they ought to have been. We accordingly informed them that we could not allow such a state of things to continue, and we hope next year to show you a great improvement in the matter of arrears. The only other item which appears to me to be necessary to dwell on is the capital suspense account, which is £16,700 now, as against £24,000 in the corresponding period of last year, and £32,000 in March, 1877. That shows a very satisfactory reduction. You know that that is the sum owing on account of Messrs. Harvey's debt. We pay it off by £4000 every half year, so that in two years from now we shall be able to congratulate ourselves on having this extra £8000 a year applicable to dividend. I have now gone through these accounts, and have dwelt on every item I thought it necessary to draw your attention to; but it does not follow that I have not omitted something, so I shall be happy to answer any question which may be put to me. I will now proceed with the report of the Directors. Clause 3 refers to the Bills brought before Parliament, and the conduct of your Directors respecting them. The first is the Bill brought in by the Metropolitan Board of Works. In conjunction with the other Companies, we felt it necessary in your interests to oppose that Bill; but that opposition necessarily caused us considerable anxiety, and required a great amount of personal attention, which was given to it by your Directors, and it also necessarily entailed some expense; but from the conduct of your Directors in treating this Bill, I can only tell you that the expense you will have to pay will be a mere bagatelle in comparison with similar payments on previous occasions. We felt strongly that the Board of Works had no right to institute such proceedings. When you consider that the costs which they have been surcharged with amount to something like £16,000, you can imagine the expense thrown on the Water Companies in their efforts to defend their Shareholders interests. All that expense is taken out of the ratepayers pockets by the Board of Works; then the cost of defending their position is thrown upon the Water Companies, and those expenses have to be paid out of the Shareholders pockets. Such a proceeding is very much to be deplored. On many previous occasions the Board of Works have thrown very heavy expenses on the Water Companies and the ratepayers, but I hope that the manner in which this last measure has been met will prevent a repetition of such proceedings. As to the Lower Thames Valley Sewerage Bill, that was a monstrous proposition—to open a sewage farm of some 900 acres, and afterwards some 1000 acres in extent, within a quarter of a mile, as the crow would fly, of your reservoirs, and close to the Thames. We believed that without doubt the filtration from that farm must flow into the Thames, and near your intake. Whether we were right or not in this view, it is quite certain that sentiment must always be taken into consideration in such propositions, and people would object to drink water so contaminated. Now we come to clause 5, which refers to the overhauling of the engines at Battersea and Hampton; but I have already explained to you, in dealing with the accounts, what was necessary to be done in that respect. In clause 6 we report that we have laid 7688 yards of new main during the past half year, 290 of which are outside our parliamentary district. I have frequently explained to you before that your Directors never lay a yard of pipe outside their parliamentary district if they can help it; but there are circumstances in which it is necessary that this should be done; and unless we did so, when such circumstances arise, we should be told authoritatively that we were not acting rightly. But we never lay a pipe outside our district without being repaid for it. Therefore, no increase of capital on that score can arise in future. As to clause 8, your late respected Chairman intimated at our last meeting that he intended to retire from the chairmanship. To Mr. Whiting, I think, our thanks are due for the very energetic manner in which he took in hand the reforms of the administration of your Company. We cannot all be right in what we do, or be well advised in the proceedings we take; but in retiring from that chair, I must say that we owe a great deal to Mr. Whiting for the manner in which he went into the details of the Company, and brought certain things to light which led to a revolution in your affairs. We may be mistaken or misguided by the manner in which we take things in hand, but I believe that Mr. Whiting was sincere in taking up these matters. Then we have to regret the loss of General Nicholson, a gentleman who, though a Director for only a short time, was regarded as a very able colleague by the other Directors. His advice was very useful in the matters that came before us, but he has received a better appointment. We have also lost our old friend Mr. Carbonell, one of the oldest of your Directors, and a gentleman who had acted on your Board for a great number of years. We had to fill up that vacancy, and we have elected Mr. Tritton, whom we believe to be competent to assist us in our deliberations, from his business connections, and the time he has at his disposal. He is connected with Tritton's bank, in Lombard Street, and we have every reason to believe that we have made a selection which we can recommend to your approval with every confidence. I should have referred also to the filling up of the vacancy caused by the resignation of General Nicholson. When this vacancy occurred, we looked around us for the man most fitted for this position; who could assist us with his advice, and who would be energetic; who would work with us, and would not allow himself to be dictated to, except where it was manifestly to the interest of the Company. In so looking around us, we noticed our friend Wyatt, and elected him most unanimously. Since he has been among us he has quite answered our expectations, and we can recommend that appointment with great confidence. The next matter in the report is that in clause 11, which refers to an old collector, Mr. Sherrard, who had been in your service for 22 years. As far as we could learn, he has always performed his duty in a satisfactory manner, and his energy had been productive of good to the Company. He has sent in his resignation, which the Directors have accepted with regret, under the circumstances, and we took into consideration, at his request, the question of giving him a retiring allowance or a gratuity. Your Board were of opinion that it was not desirable to introduce the precedent of retiring allowances. We had given previously one collector a retiring allowance of £100 a year, but he had served us for something like 32 or 33 years, and you, when the proposal was brought before you, approved it, and it is now paid to that collector under your approval. But we thought that if we pensioned another collector with another sum, it would create a precedent which might be used to the detriment of the Company. Your Directors therefore decided that, in the case of Mr. Sherrard, they would not recommend the payment of an annual sum, but a gratuity. All the particulars were thoroughly inquired into, and it was thought the sum we now recommend to you would be a fair one to give him, in consideration of the services he has rendered to the Company. It is a question which, of course, has to be submitted to you for your approval. Your Directors have used their best judgment in coming to a decision, and they now leave the matter with you as they recommend. Or, if you require any alteration to be made, the Directors will reconsider the matter in connection with any recommendations you might make to them. I now come to the 12th clause, which I do not think calls for any remark; and, lastly, I come to that clause which recommends to you a dividend of 5 per cent. per annum. Now, gentlemen, it is cheering, and it is most gratifying to me, after having worked for you now something like three years, to see that what I said from the very first time I came on the Board has been so far realized. Your dividend went down deplorably to 2 per cent., but it was paid honestly and fairly out of your earnings. We then paid you 3 per cent., carrying forward £560; next you received 4 per cent., and we carried forward about £11,000; and now we propose 5 per cent., and to carry forward something like £16,000. Therefore we not only increase the dividend, but what we might call the reserve dividend account. We hope that we shall go on with the same increasing prosperity, pay you a better dividend, and show an increase to the reserve dividend account, and I see no reason whatever why this should not be the case if the Directors still continue to give the same energy and attention to your business as hitherto. We do not mind working, if our services are appreciated by those for whom we work. We have a triple object in view. That object, if I am permitted to remain your Chairman, and the Board work with me as they have hitherto done, and the Officers support your Board, I feel satisfied that we shall obtain. We mean to supply the best water in the Metropolis, we intend to supply it at the lowest charge of any company in the Metropolis, and we intend to pay you the best dividend of any company in the Metropolis. I now beg to move the adoption of the report and accounts.

Alderman T. Q. FINNIS seconded the motion, and it was carried unanimously.

The CHAIRMAN next moved, and Mr. JOHN HODGES seconded, the following resolution, which was also carried unanimously:—"That the following half-yearly dividends be declared payable on and after July 15, 1879—viz., at the rate of 5 per cent. per annum on the ordinary stock and class D shares, and 5 per cent. per annum on the preference stock and the preference shares of the Company."

On the motion of Mr. KEYS, seconded by Mr. GIVERS, a gratuity of £225 was unanimously awarded to Mr. R. W. Sherrard, on his retiring from the position of collector to the Company.

On the motion of Mr. MARSHALL, seconded by Mr. BLICK, a vote of thanks was passed to the Chairman and Directors.

The CHAIRMAN, in returning thanks, said: Gentlemen, on behalf of my co-Directors and myself I can assure you that we thank you very much for this expression of your opinion. It is pleasant to a body of Directors, when they feel that they have worked hard and done well, to meet with such approval; and if the result of our attention to your business is such as I have been able to place before you to-day, it will be always a pleasure for us to meet you.

The proceedings then terminated.

NICTHEROY (BRAZIL) GAS COMPANY, LIMITED.

The Eleventh Annual Meeting of this Company was held on Thursday, the 5th inst., at the Offices, 6, Great Winchester Street—Mr. H. L. MICHOLLS in the chair.

The SECRETARY (Mr. W. W. Wright) having read the advertisement convening the meeting, the following report and accounts were taken as read:—

The Directors submit herewith the accounts for the year 1878, duly audited. They regret that these are not as favourable as they had hoped for. Many causes have produced this result. The depressed state of Brazil, owing to droughts, famine, epidemics, and continued bad trade, has hindered the extension of the private consumption of gas, and diminished the sales of residual products. The loss on exchange has also been very severe, amounting to a large sum, which has had to be carried to the debit of revenue. In addition to this, the ill-health of the late Manager previous to his death was a serious detriment to the well-doing of the Company.

The present Manager, who took charge in September last, has hitherto entirely justified the high recommendations that he brought to the Directors. He has introduced important economies in the working, and there is good reason for believing that under his management the position of the Company will materially improve.

It will be seen that the profit for the year is £2604 17s. 4d., after deducting all bad debts, making provision for doubtful ones, and placing £1000 to reserve account. A dividend of 2 per cent. was paid in October last, absorbing the sum of £1689 8s., and there remains £1209 14s. 1d. to carry forward for future distribution.

Mr. Charles Neate is the retiring Director, and, being eligible, offers himself for re-election.

The Auditors, Messrs. Price, Waterhouse, and Co., retire, and offer themselves for re-election.

Revenue Account, Dec. 31, 1878.

Dr.		*Cr.*	
Coals carbonized	£4,778 6 4	Gas supplied to street-lamps	£10,856 10 7
Purifying materials	58 15 7	Less fines	358 2 7
Carbonizing wages	639 18 1		£10,498 8 0
Yardmen and labourers	575 11 8	Public buildings	473 18 2
Lamplighters and inspectors	879 11 10	Private consumers	4,105 5 5
Salaries and commissions on collection in Brazil	927 10 2	Residual products	1,141 13 9
Agency in Brazil	600 0 0	Fittings and sundries	97 12 8
Honorarium to concessionaire, pursuant to arbitration award	250 0 0	Transfer fees, &c.	7 12 0
Maintenance, including proportion of renewals	890 1 7		
Traveling expenses	50 0 0		
Insurance of works	100 0 0		
Brazilian taxes	67 12 6		
Directors remuneration	500 0 0		
Office expenses in London and Brazil	381 14 4		
General expenses in London and Brazil	204 2 5		
Law expenses, 1877 and 1878	67 7 3		
Bad debts	330 3 1		
Reserve for doubtful debts	200 0 0		
Auditors	21 0 0		
Interest on debentures	274 3 4		
Interest	32 5 6		
Income-tax	92 16 8		
Loss on exchange	798 12 4		
Amount carried to reserve for depreciation and cost of concession	1,000 0 0		
Balance, being profit for the year, carried down	2,604 17 4		
	£16,324 10 0		£16,324 10 0
Interim dividend, 1878	£1,689 8 0	Balance brought down	£2,604 17 4
Balance of revenue, Dec. 31, 1878	1,209 14 1	Surplus of revenue, 1877	294 4 9
	£2,899 2 1		£2,899 2 1

The CHAIRMAN: In moving the adoption of the report, I cannot but express some regret that the accounts are not more favourable; yet I believe, taking the unfortunate circumstances that have occurred, they are as good as could possibly have been expected. The state of Brazil during the past year has been extremely bad. Unfortunately, our previous Manager, Mr. Trueby, did not do his duty. He was under notice to leave us, and we had engaged another gentleman—Mr. Martin—as his successor, and on his arrival Mr. Trueby died. By our late Manager's neglect of his duties, both on the works and as to the management of the private consumption, very serious losses accrued to the Company. Our new Manager, who took charge of the works last September, found a large portion of our machinery in a most disordered condition; but, so far, I think, he has proved himself to be a good man. He has put everything in fair working order, the result being an increased production of gas, which now averages considerably over 12,000 feet per ton of coal carbonized, whereas for a very long time Mr. Trueby never produced more than 8000 feet. That alone is a favourable consideration for the future of the Company. Mr. Martin seems to have secured the good-will of the consumers, and has made friends with the officials. By these means the very heavy fines to which we have hitherto had to submit have been considerably reduced; and I trust that in the future this is another matter that may act favourably to the Company. You will see that, after all our expenses, we have a balance of revenue of £1209. This sum is not sufficient to pay an adequate dividend, after putting to the reserve-fund a sum which I consider, and which is by the Auditors considered to be not at all too large—namely, £1000. There has been some feeling among the Shareholders that we ought to pay a dividend, and reduce the amount of the reserve-fund; but when I consider, as the Chairman of this Company, the interests of the Directors, I must say that, for my own part, I do not feel inclined to reduce any amount that has been put to depreciation; and our reserve-fund, I think, is not more than it ought to be under the present circumstances of the Company. Therefore I should strongly recommend that no dividend be paid, and that the sum put down should be carried forward. If, however, it be the wish of Shareholders so to deal with their property that they require a dividend, it is not in my power, nor is it in the power of the Directors, to prevent it. Naturally a great many of the Shareholders will feel disappointed; but when they remember that upon our concession expiring they will have something substantial to fall back upon, I feel sure they will come to the conclusion that the Directors are doing their duty to them in adopting the course they now propose. If anybody desires to submit a motion to the contrary, of course, I could not oppose it; but I certainly should object to any reduction of the amount placed to the reserve-fund. The amount we have would pay a dividend of 1½ per cent. That I do not say I should oppose, though I consider it would be better to carry it forward, so that we might be enabled to use it in the coming year, and that some compensation might be made for the non-receipt of a further dividend for the year. The condition of the works, I am glad to say, is now, as far as we can learn, satisfactory. The partner of one of our Directors—Mr. Beesley—who was in Rio during the past year, had an opportunity of seeing the works, and he kindly communicated his opinion to us that they were then extremely well managed. This, I think, is highly satisfactory, as Mr. Beesley is a Shareholder, and is also a thoroughly practical and able engineer, perfectly competent to judge of what a well-managed concern ought to be. It will, I think, be satisfactory to the Shareholders to hear his report. Our own is really that we look forward to a better year. The much larger increase in the production of gas, and the greater care which is being taken in the general management of our business on the other side, induce us to think that at the end of the present year we shall be able to present a much more favourable report than the one for the past. Gentlemen, I do not know that I have anything further to say, but I trust that when we meet next year our accounts will be much more agreeable than they have been. I have now to propose that the report and accounts submitted be received and adopted.

Mr. GOTTO, in seconding the motion, said it would be observed from the accounts that the bad debts had been provided for. The Chairman had referred to the friendly nature of the relations between the Manager and the officials, which was a very important element in the success of the undertaking. He might also state that they had placed the collection of their debts upon a better basis, and from the experience they had received of the working of the new plan, he thought there would be very few bad debts to provide for in future in connection with lighting and fitting. The total surplus revenue was £2604, of which it was proposed to place £1000 to the reserve-fund. Of course, the Shareholders could decide that it should be divided, and the amount at their disposal would, as the Chairman had stated, give a dividend of 1½ per cent., still adding £1000 to the reserve-fund; but then there would be nothing carried over. The prospects of the present year were such that they might look forward to a larger amount of revenue, and to the payment of a reasonable dividend.

The CHAIRMAN said he had omitted to say, with regard to Mr. Trueby, that that gentleman had tendered his resignation at the time of his death, and that Mr. Martin had been appointed in his place. With reference to the question of insurance, he had stated last year that £90 per annum was paid to an insurance company in England; but it was found that, owing to certain clauses in the policy, the insurance was really of no effect. The matter was left to the judgment of the Board, and for some time they had almost thought of giving up insurance, and taking the risk on themselves; but by an arrangement with the company, and a payment of an additional £10, their works were secured against all accidents by fire.

The motion for the adoption of the report was then put, and carried unanimously.

The retiring Director and Auditors were then re-elected, and a vote of thanks to the Chairman terminated the proceedings.

THE NEW GAS-WORKS OF THE HEREFORD CORPORATION.

On Thursday, the 5th inst., the Hereford Town Council paid an official visit to their new gas-works, which are being pushed on towards completion on the site of the old waggon-works at Widemarsh. Our readers may remember that the demand for gas, for both private and public purposes, in Hereford, having for some time past been felt to be such as to put an undue strain upon the producing and storing capacity of the old works, the majority of the Council last year (and in opposition to the views of a by no means inert minority) purchased the waggon-works at Widemarsh, with a view of providing the city with gas-works commensurate with the demand for light, and calculated to meet its wants for a good many years to come. The waggon-works buildings, consisting of a large foundry, shops, engine and boiler houses, &c., were held to be most desirable adjuncts to the site, as they could be utilized at a comparatively small outlay, and thereby be made to obviate the erection of new buildings. The supporters of the scheme also urged that the site was suitable, being removed a reasonable distance from the centre of population, so that the works were not likely, either now or at any near period, to prove objectionable to the inhabitants. The sum to be expended before the works could be considered completed was undoubtedly a large item, and many ratepayers, looking at the matter superficially, jumped to the conclusion that an unnecessary outlay was about to be effected. Matters were made worse by the electric light scare, and for a short time those who were mainly responsible for the undertaking had hard work to prevail against a section of public opinion. Conscious, however, that the undertaking was on a sound financial basis, the majority of the Council proceeded with the work.

With the exception of the new offices, the whole of the work has been done by the Corporation, through Mr. W. Davis, their Gas Manager, and the other Officers, the immediate supervision of the work being left to the Gas Management Committee, of which Mr. Philip Ralph, who has been an unflinching advocate of the scheme, is Chairman. Since the break-up of the frost the works have been pushed rapidly forward, and those who have been the leading promoters of the project have now the satisfaction of knowing that, on cool reflection, the ratepayers, almost to a man, are convinced of the wisdom of their proceedings.

Arrived at the works, the party proceeded to inspect them, under the guidance of Mr. Ralph and Mr. Davis, who explained what had been done. The new offices are completed up to about the middle of the second storey. They will be solid and substantial, but without any pretensions to architectural display. The retort-house is nearly completed. The iron framework of the roof has been fixed, but the slates are not yet on. The masonry of the retorts has been completed up to the springs of the arches, and the chimney-stack is finished with the exception of 5 feet. The tar and liquor tanks also are practically finished. They, together, have a capacity of 50,000 gallons. Substantial progress has also been made in the purifier-house, which is the old waggon-works foundry converted. Although well adapted as a whole for the purpose, it may be found necessary to raise the roof, and if this proves to be the case, it will be done by means of screw-jacks, and built under. The engine-houses were also visited, where a 6-horse power engine is fixed, to work a pulsometer pump. The plant, purchased from Salford—which being, for all practical purposes, as good as new, and procured at a cheap rate, is a capital investment—was also examined, and, indeed, was everything of interest in the works. The visitors, without exception, expressed themselves pleased with the excellent workmanship which characterized everything that had been done. The operations at the large tank for the gasholder, where the pulsometer, which is now down about 21 feet, is at work, were watched with particular interest. There is a large influx of water, but nothing more than the apparatus can manage. At the time the Council were there, the water had gained somewhat, as the pulsometer was only going about two-thirds stroke. The difficulty experienced from the water, as time has gone on, has, fortunately, not been found greater than was expected. The strata has, on the whole, proved favourable to the undertaking, no running sand or difficulties of that kind being met with to any serious extent. A stratum of hard sandrock, which has to be blasted by rock powder and dynamite,

has, however, been reached, and meeting this formation has somewhat retarded the progress of the excavations; so that, although Mr. Davis had hoped to be able to make gas at the new works in November next, it is doubtful whether, owing to the slow progress of the tank, he will be able to do so as early as he originally anticipated.

At the conclusion of the visit, Mr. Ralph invited the company to luncheon before leaving the works.

ATHERTON LOCAL BOARD GAS-WORKS.

The extensions and improvements of the Atherton Gas-Works, which commenced in the year 1874 (the year following that of the transfer to the Local Board), and have, more or less, been in progress from that time to the present, are now completed, so far as is at present contemplated. The result is that the Local Board have now practically new works, capable of meeting the requirements of the district, without further outlay, when the consumption of gas shall have increased to more than double the quantity at present required.

The works transferred to the Local Board were amongst the oldest in that part of the country, and had become inadequate to meet the rapidly-growing demand for gas, both by reason of the worn-out condition of the buildings and plant, and of their insufficient capacity. The old buildings, with the exception of the office, have been entirely replaced, and the only portions of the plant remaining in their former condition are the No. 2 gasholder of 35,000 cubic feet capacity, and the condenser, both of which have been added by the old company only a few years previous to the transfer. The erection of the new works has been effected upon the old site, without a single day's interruption of a full supply of gas to all the customers of the Board.

The following is a brief description of the new works, in the order in which they have been executed, that order being determined by the urgency in which the alterations and additions were severally required:—New governor, with 12-inch connections and bye-pass. Station-meter renewed, with the exception of the casing and connections. Renewal of No. 1 gasholder and tank. One new set of four purifiers, each 12 feet square, with five tiers of wood grids and 12-inch connections, worked by centre-valve, the lifting apparatus running upon wrought-iron lattice girders. New purifying-house, 42 feet square by 20 feet high, with cellar, and timber and slate roof, louvred. Two new wrought-iron scrubbers, each 18 feet high by 5 feet diameter. One single-lift gasholder and tank. The holder, 80 feet diameter, and 26 feet deep, capacity about 130,000 cubic feet, with syphon well and 12-inch inlet and outlet pipes, valves, &c.

The more recent improvements, described below, have been the entire replacement of the carbonizing plant by new buildings and apparatus, designed by Mr. Thomas Newbigging, C.E., of Manchester, and executed under his inspection.

The new works are calculated for a production of 180,000 cubic feet of gas per day; but with the addition of more retorts, for which space has been allowed, they can easily be adapted for 250,000 cubic feet per day. The retort-house, which measures 56 feet wide inside, and 24 feet high in the side walls, is covered by an iron roof. The retort-bench, 20 feet wide, is placed in the centre, leaving 18 feet at each side for stoking operations. The chimney is at one end of the bench, but when the future enlargements of the premises take place it will then be in the middle. There is a coal store, 50 feet long, 44 feet wide, and 16 feet high to underneath the beams, covered with a wood roof. The station-meter house is 16 feet square; boiler-house, 16 feet by 10 feet; exhauster-house, 16 feet by 12 feet; store-room, 18 feet by 16 feet; and a workshop 27 feet long by 14 feet wide.

The carbonizing benches are eight in number, and at present contain 40 D-shaped clay retorts, 18 inches wide, 14 inches high inside, and 9 ft. 6 in. long outside. They are set five in a bench, and the beds are so arranged as to hold seven retorts each, whenever it may be necessary to employ that number. They are fitted up complete, with the usual modern appurtenances of the best description, and Livesey's section of hydraulic main, 24 inches wide by 17 inches deep. The foul main, 10 inches in diameter, runs half-way round the inside of the retort-house previous to entering the condenser, which is of the atmospherical vertical description.

The scrubbers, two in number, are fitted with water-distributing apparatus and tumblers complete, with water-cistern overhead. The Engineer has modernized and improved the working of the condenser and scrubbers as far as possible.

The exhauster, which is Anderson's type, is capable of passing 10,000 cubic feet of gas per hour, and is fitted up with boiler feed-pump, and tar and liquor pumps, and regulated by an ingenious hydraulic governor. A single-flued Cornish boiler, 5 feet in diameter and 12 feet long, is provided for supplying steam to the exhauster, and for other purposes. Over the boiler and exhauster houses a cast-iron cistern is erected, 27 feet long, 18 feet wide, and 3 feet 9 inches deep, supported on girders, for the storeage of the tar and ammoniacal liquor, which are pumped up from the tar-well, and afterwards run off from the cistern by two 3-inch iron stop-cocks into the contractor's tar-barrels as required. The cistern is divided into three compartments or divisions, of unequal size, one for clean water for supplying the boiler and the coke-slaking apparatus; another for the ammoniacal liquor, and the third for the tar; the tar and liquor being separated from each other by gravity. The retort-house is so arranged that it can be doubled in size, thus doubling the producing power of the works at any future time.

Mr. D. Schofield, as Manager of the gas-works, has had the immediate supervision of all the extensions since the works became the property of the Local Board.

The work of the Local Board in the improvement of the gas-works may be summarized thus:—(1) The old buildings have been entirely removed, and replaced by new and substantial erections of more than double the original extent, and are arranged according to the most approved modern ideas. (2) The retort-benches are now capable of containing 504 lineal feet of retorts, against 216 feet in the old bench. (3) The purifying apparatus formerly contained 400 superficial feet of lime grids, and has been replaced by others containing 2880 superficial feet, besides the addition of two scrubbers, of which the old works were entirely deficient. (4) The storeage capacity was originally limited to two small gasholders, together of the capacity of 52,000 feet; but as the oldest of them was almost unusable, there was not even storeage to that extent. The total capacity of the gasholders is now about 182,000 cubic feet. (5) The storeage for tar and ammoniacal liquor has been about doubled, and arranged so as to reduce to a minimum the manual labour required in loading carts. (6) The stores for materials, the workshops, and the steam power have been entirely replaced by other buildings and plant of enlarged capacity and improved construction.

The total cost of these improvements has been about £10,000; in addition to which a sum of nearly £2000 has been expended upon new and larger street-mains. Such a large outlay as this would necessarily have increased the cost of producing gas to a very considerable extent, had the consumption of gas been stationary; but such has been the constant growth of the demand, that the cost to the Board for interest and repayment of loans has not increased more than 4d. per 1000 feet since the purchase of the works. Against this may be placed the economy effected in working expenses, and the facilities for supplying gas of a purer quality. And as there cannot be any further considerable outlay required for the next ten or twelve years (assuming that the rate of increase will continue as hitherto), the cost of production per 1000 feet will every year diminish. In fact, two years increase, at the average of the last five years, will reduce the cost on capital account to the amount at which it stood after the purchase of the works in 1873.

The future requirements of the district, beyond the producing power of the present new works, have always been kept in view; and the works are so arranged that their manufacturing and storeage capacity may be again doubled without extension of the site, and without material alteration of the present works, the latter being designed to form part of larger works, when required.

THE NEW GAS-LAMPS IN QUEEN VICTORIA STREET.

The following report, "upon the experiment in gas lighting Queen Victoria Street by means of improved burners and lanterns," from their Engineer (Lieut.-Col. Wm. Haywood), was presented to the Commissioners of Sewers of the City of London, at their meeting on Tuesday, May 20, and has just been issued to the public:—

NEW GAS-LAMPS—QUEEN VICTORIA STREET.

Engineer and Surveyor's Department,
Sewers Office, Guildhall, May 9, 1879.

To the Streets Committee of the Honourable the Commissioners of Sewers.

Gentlemen,—In pursuance of your reference, I beg to report the following facts with regard to this experiment.

Application was made by The Gaslight and Coke Company, in January last, for permission to make an experiment with new gas-burners in that portion of Queen Victoria Street which lies between the Mansion House Station and Poultry. This was granted, on condition that the experiment was made entirely at the cost of the Company.

The alterations to the gas-lamps were commenced on the 24th of February, and completed on the 6th of March, each lamp being lighted on the new system as it was altered. Since the 6th of March the whole have been lighted nightly.

Description of Burners and Lamps.

The new lamps are fitted with Sugg's "London" Argand governor burners, which, like other Argand burners, have glass chimneys. The burners are of two sizes, one consuming 22 cubic feet of gas per hour, the other 50 cubic feet. The gas is consumed in the smaller burners in two concentric columns or rings of flame, and in the larger burners in three rings.

The burners are so arranged as to be self-lighting when the gas is fully turned on. This is effected by means of a small flash-jet, consuming from a quarter to half a cubic foot of gas per hour, which is kept alight constantly in the centre of the Argand burner. This jet is probably needed also to prevent the too sudden heating of the glass chimney. All that is required to obtain the full light from the lamps is to turn on the gas, which is done by an ordinary tap fixed at the bottom of the lantern.

The burners are in lanterns of an improved description, the smaller burners in lanterns octagonal on plan, the larger in lanterns twelve-sided on plan. Both lanterns are larger than those ordinarily used, and have the upper parts glazed with a new kind of white glass, which partly reflects and partly transmits the light; the lower portions are glazed with ordinary clear glass. Proper means are provided in both for ventilation, as well as for preventing down-draughts from reaching the flame.

All the experimental lamps are fixed on the columns or standards which carry at other times the ordinary gas-lamps belonging to the Commission. There are thirty of the smaller experimental lamps, and five of the larger. Twenty-six of the smaller lamps are on columns at the edges of the kerb, and four on the columns on the resting-place in the centre of the carriage-way of Queen Victoria Street by Queen Street.

The five large lamps are placed on the 5-light standards in the centres of resting-places, one of which is by the Mansion House, one in Queen Victoria Street by Queen Street, and three near the Mansion House Station.

The number of ordinary gas-lamps superseded by the 35 experimental lamps is 55.

The length of street lighted is 353 yards. Each new lamp lights an area of about 253 yards superficial of public way.

Illuminating Power.

The burners consuming 22 feet of gas per hour have an estimated illuminating power of 80 candles; the 50-feet burners a power of 200 candles. The light given, therefore, should be as follows:—

	Candles.
30 lamps, each producing 80 candles illuminating power =	2400
5 lamps, each producing 200 candles illuminating power =	1000
Total illuminating power . . . . . =	3400

Under the ordinary arrangement, each 5-feet bat's-wing burner should produce a light equal to about 14 candles. The 55 street-lamps, which are temporarily superseded, would therefore be equal to 770 candles.

On these data the 35 experimental lamps give 4·42, or nearly 4½ times as much light as the 55 ordinary lamps.

Cost.

The relative costs of the two modes of lighting appear to be as follows:—

By the ordinary system the contract price to the Commission for each lamp, including lighting, extinguishing, &c., is £4 17s. 6d. per annum, or a total charge per annum of £268 2s. 6d. for the 55 lamps. The cost per annum of the experimental lighting is stated by the Gas Company to be as follows:—

For the 30 small lamps—			
Each consuming 22 cubic feet per hour for 4300 hours = 94,600 cubic feet, at 3s. 6d. per 1000	£16 11 0		
Estimated charge for cleaning, lighting, repairing, &c.	2 10 0		
Total per lamp per annum	£19 1 0		
Total for 30 lamps per annum		£571 10	0
For the 5 large lamps—			
Each consuming 50 cubic feet per hour for 4300 hours = 215,000 cubic feet, at 3s. 6d. per 1000	£37 12 6		
Estimated charge for cleaning, lighting, repairing, &c.	3 10 0		
Total per lamp per annum	£41 2 6		
Total for 5 lamps per annum		205 12	6
Total cost per annum		£777 2	6

The expense by the ordinary system being £268 2s. 6d., and by the

experimental £777 2s. 6d., the new system is 2·89, or nearly three times as much as the ordinary system.

The general result, therefore, of the experiment is that the new system of lighting gives nearly four and a half times as much light as that in general use, and costs about three times as much.

It should be mentioned that the illuminating powers of the new burners have been supplied me by the Gas Company, the Commission possessing no photometrical observations of the light given by them.

The experiment demonstrates that the public ways can be lighted in a very ample and satisfactory manner by gas. The experiment with electricity on the Holborn Viaduct gave a similar result. The question to be considered, before increased cost is incurred in street lighting, is whether the public necessities are such as to render generally necessary a more expensive mode than that now ordinarily in use.

(Signed) WILLIAM HAYWOOD, Engineer and Surveyor.

STAFFORDSHIRE POTTERIES WATER-WORKS COMPANY.

The Annual General Meeting of the above Company was held at the Offices, Hanley, on Friday, May 30—Mr. J. ALCOCK in the chair.

The SECRETARY (Mr. J. Beaumont Piercy) having read the notice convening the meeting, the following report and accounts were presented:—

In submitting to you the annual statement of accounts, made up to March 25, 1879, duly examined and certified by the Auditors, your Directors have to report an increased rental for the year ending March 25, 1879, exceeding that of the previous year by the sum of £637 0s. 8d.

The balance for the year ending the 25th of March last, and the previous undivided balance, £642 18s. 3d., make a total of £6328 7s. 10d., out of which your Directors recommend that a dividend be declared at the rate of 6 per cent. per annum (clear of income-tax), and payable by dividend warrants, to be forwarded to the Stockholders on the 24th of June next. This will absorb the sum of £5649, and, after placing a sum of £1000 to the reserve-fund account (which will then amount, with interest, to £6387 19s. 4d.), leave a surplus of £679 7s. 10d. to be carried to next year's account.

The additional supply of water at the Meir extension works having continued in greater quantity than the temporary sinking plant was capable of raising, your Directors determined to erect an engine and pumping plant of greater power, to enable the shaft to be completed and the necessary cruts driven. This engine will be got to work in the course of a few weeks, and will probably be kept as an auxiliary engine.

Although the increased supply of water has more than answered the expectations of the Directors, they regret that the rapidity of the flow, and nature of the strata in the new sinking, have rendered it impossible, whilst the work was in progress, to prevent occasional discoloration of the water; but they have every reason to expect that when the new engine is at work the difficulty will be overcome, and the public will receive an ample supply of water without any grounds of complaint as to its quality.

During the exceptionally severe and long-continued winter the pumping power of the Company had to be maintained at its full extent, as the supply required was fully equal to the summer demands.

A new 10-inch main has been laid to connect the Hanley and Stoke districts, which will be of great service in equalizing the supply derived from Wall Grange and the Meir.

The Directors who go out this year by rotation are Edmund T. W. Wood, Colin Minton Campbell, M.P., and James Bull, Esqs.; but, being eligible for re-election, offer themselves accordingly.

Mr. Robert E. Narramore, the Auditor, who retires by rotation, is eligible for re-election, and the Secretary has received notice of his nomination.

DR.—*Revenue Account, for the Year ending March* 25, 1879.

June 25, 1878—			
To Six months dividend on £182,000 consolidated stock, at 6 per cent. per annum	£5,460 0 0		
Three months dividend on £4200 paid-up new stock, at 6 per cent. per annum	63 0 0		
Dec. 27—			
Six months dividend on £182,000 consolidated stock, at 6 per cent. per annum	5,460 0 0		
Six months dividend on £4200 paid-up new stock, at 6 per cent. per annum	126 0 0		
		£11,109 0 0	
Interest on debenture stock, mortgages, and loans, including interest on £4629 7s. 6d., invested in 4 per cent. India Stock for Miss Clowes's annuity		1,959 6 11	
Working expenses at pumping-stations, viz.—			
Wall Grange	£1,209 6 2		
The Meir	1,239 18 2		
Tunstall	179 11 1		
		2,628 15 5	
General and establishment charges, viz.—			
Rent	£1,017 0 9		
Mr. Hammersley, for water supply at Leek, as per agreement	50 0 0		
Compensation	3 0 0		
Expenses incurred in the arbitration respecting the stroke of the Wall Grange engine	342 19 0		
Income and assessed taxes	280 11 1		
Other rates and taxes	1,479 16 11		
Insurance	31 2 9		
Law costs	144 19 10		
Service-pipes and cisterns	134 11 4		
Repairs to mains, fire-plugs, and meters	1,013 17 11		
Repairs to buildings and reservoirs	59 3 10		
Salaries	1,371 4 0		
Turncocks and inspectors wages and clothing	966 4 10		
Printing, advertising, and stationery	75 3 2		
Directors	400 0 0		
Auditors	21 0 0		
Bankers interest and commission	149 4 8		
General charges and postage	266 16 8		
		7,805 16 9	
Voids, abatements, &c.	264 4 4		
Bad debts	43 17 1		
		308 1 8	
Amount carried to reserve-fund		1,000 0 0	
		£24,811 0 6	
Balance available for dividend		6,328 7 10	
		£31,139 8 4	

CR.—*Revenue Account.*

By Balance of last account		£6,165 18 3	
Additional rents, Lady-day, 1878	£120 11 5		
Gross rents, Michaelmas, 1878	12,389 11 8		
Gross rents, Lady-day, 1879	11,694 17 4		
		24,205 0 5	
Repairs to mains, plumbing, and fittings for the year	£494 19 5		
Bank interest on same	7 13 1		
		502 12 6	
Rents from Leek property	£218 4 11		
Other rent and acknowledgment	2 14 6		
		220 19 5	
Manchester Boiler Insurance Company, for damage to boiler at the Meir		40 0 0	
Fines for waste of water		4 17 9	
		£31,139 8 4	

The CHAIRMAN, in moving the adoption of the report and accounts, said he thought it was a subject of congratulation that the affairs of the Company were in such a prosperous state. With regard to the supply of water, the Directors regretted to find that some complaints had been made at Stoke of the discoloration caused by sinking operations at the Meir. He was sorry that persons receiving a supply from that source had suffered any inconvenience, but the discoloration had been unavoidable, and he hoped there would be no further cause for complaint. With regard to the accounts, he would just call attention to one or two items. It would be seen that there was an increase of £550 on last year in the cost of repairing and renewing mains. There was also an item of £300 or £400 for costs of the arbitration, as to the question of pumping at Wall Grange. The result of the inquiry was that some advantage would be gained by the Company. The question had been in dispute for some years, but was now definitely settled to the Company's advantage.

Mr. H. G. BALL seconded the motion, and it was unanimously adopted.

The retiring Directors and Auditor were then severally re-elected, and the proceedings terminated with the customary vote of thanks to the Chairman and Directors.

STAFFORD CORPORATION GAS-WORKS.

In the JOURNAL of the 3rd inst., a brief reference was made to the results of the operations carried on at these works since they became the property of the Corporation. We have since been favoured with a copy of the accounts of the Gas Department (Mr. John Storer, Manager) for the nine months ended March 25 last, from which it appears that on July 1, 1878, there had been expended on fixed plant, mains, services, meters, &c., a sum of £74,983 6s. 8d.; additions to date of account, £2398 18s. 8d.; total, £77,382 18s. 8d. The following are the revenue and the profit and loss (net revenue) accounts:—

DR.—*Revenue Account, for the Nine Months ended March* 25, 1879.

To Manufacture of gas—			
Coals, including dues, carriage, unloading, and all expenses of depositing same on works	£3,189 5 9		
Purifying materials, oil, water, and sundries at works	127 7 7		
Salaries of Engineers, including Chief Engineer, Superintendents, and Officers at works	337 10 0		
Wages and gratuities at works	553 19 5		
Repair and maintenance of works and plant (including renewal of retorts), machines, apparatus, tools, materials, and labour	985 12 0		
		£5,173 14 9	
Distribution of gas—			
Salaries of Surveyor, Chief Inspector, Inspectors, Assistant Inspector, and Clerks in Light Office	£72 0 0		
Repair, maintenance, and renewal of mains and of service-pipes, including materials, laying and paving, and labour	125 6 5		
Repairing, renewing, and refixing meters	232 5 9		
		429 12 2	
Public lamps—lighting and repairing		192 0 11	
Rents, rates, and taxes—			
Rents	£1 2 6		
Rates and taxes	202 11 1		
		203 13 7	
Management—			
Salaries of Accountant and Clerks, Office Keepers, and Messengers	£105 0 0		
Collector's commission or salary	90 0 0		
Stationery and printing	31 4 10		
General establishment charges and incidentals	48 15 3		
		275 0 1	
Depreciation-fund		580 7 3	
Bad debts		27 10 4	
Total expenditure		£6,881 19 1	
Balance carried to profit and loss account		4,825 4 7	
		£11,707 3 8	

CR.—*Revenue Account.*

By Sale of gas	£9,118 16 5		
Ditto for public lighting and under contracts	806 15 3		
		£9,925 11 8	
Rental of meters		388 5 1	
Residual products—			
Coke, less labour and cartage	£611 14 3		
Tar, ditto	570 2 2		
Ammoniacal liquor	140 11 9		
		1,322 8 2	
Rents		17 2 0	
Fitting and service—laying account		53 16 9	
		£11,707 3 8	

DR.—*Profit and Loss Account (Net Revenue), for the Nine Months ended March* 25, 1879.

To Income-tax		£81 0 5	
General district-fund—amount transferred in reduction of rates		700 0 0	
Interest on temporary loans, accrued to March 25, 1879	£486 5 7		
Interest on loan, accrued to March 4, 1879	1,144 8 1		
Interest on perpetual annuities, accrued to March 25, 1879	424 10 0		
Interest on debenture bonds to Dec. 31, 1878	118 11 11		
		2,173 15 7	
		£2,954 16 0	
Balance		2,342 5 9	
		£5,297 1 9	

CR.—*Profit and Loss Account.*

By Balance of net profit, brought from last account (June 30, 1878)	£471 17 2	
Revenue account balance, being profit for the nine months ending March 25, 1879	4,825 4 7	
	£5,297 1 9	

At a special meeting of the Stafford Town Council, held last Tuesday—the MAYOR (Mr. F. Marson) presiding—the report of the Gas Committee having been read,

Alderman Cox explained at some length the position of the gas accounts, which, he said, were made up to the 25th of March last, and included a period of nine months only. The balance of the revenue account was £4825 4s. 7d., and there was a balance of net profit brought forward from last year, making a total of £5297 4s. 7d. An amount of £700 had been transferred to the general district fund in reduction of rates, and this, with payment of interest and income-tax, had reduced the available balance to £2342 5s. 9d. The Committee recommended that £1500 of this be appropriated to the district fund to assist in the reduction of the rates, leaving a balance of £842 5s. 9d. The Committee proposed to reduce the price of gas 4d. per 1000 feet from the 1st of October next. This would diminish the revenue to the extent of £920.

Alderman AVERILL seconded the adoption of the report.

Mr. GOODALL made an ineffectual attempt to obtain a reduction of 6d. per 1000 feet in the price of gas, contending that it was only proper that the consumers should have a share in the profits of gas-making.

Mr. FOLLOWS said the largest consumers were the largest ratepayers. He considered there was no reason to look for a reduction. The division of the profits was fairly apportioned.

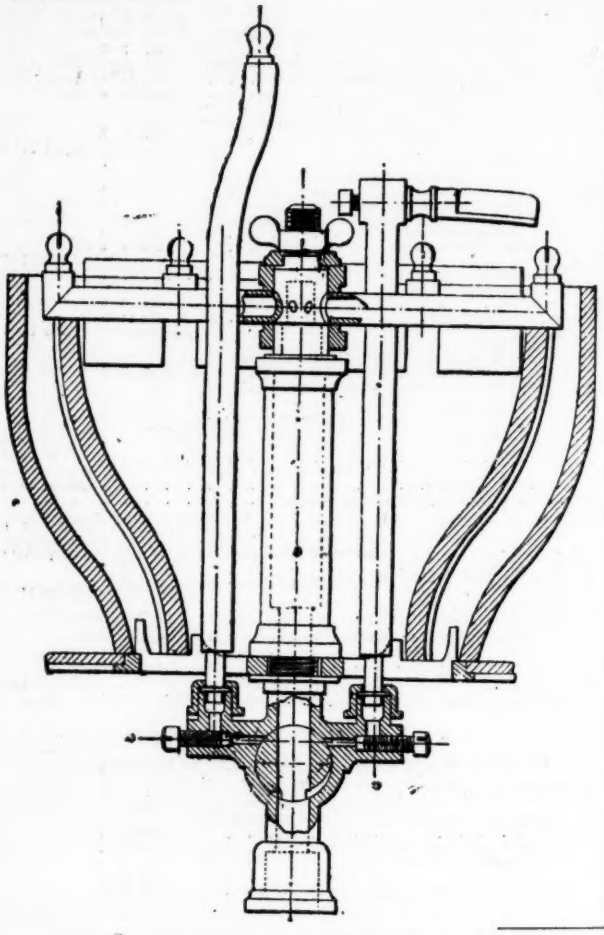
The report was then confirmed.

THE NEW GAS-LIGHTS IN PARIS.

As recorded in the JOURNAL for May 6, p. 673, the Paris Gas Company, on the 30th of April last, introduced a new system of street illumination by lighting the Rue du Quatre Septembre by means of improved gas-lamps and burners. As the latter are altogether unlike those which have been employed in the recent street-lighting experiments in the Metropolis, the accompanying sketches and description of the apparatus, which appeared in a recent number of the *Journal des Usines à Gaz*, may possibly possess some interest for the English gas world.

It is not claimed for the new burners that they produce results superior, or even equal to those obtained with Sugg's Argands; they have, however, the advantage of not requiring a chimney. The light is protected from the outer atmosphere solely by the glass of which the lantern is composed, and the supply of air necessary for combustion, as well as for carrying off the products of that combustion, is so arranged as to allow of the present form of street-lamp being preserved, the only difference being, of course, in the dimensions.

The apparatus consists of six batswing burners, mounted upon copper supports, and so arranged as to form a ring about 6 inches in diameter, the orifices being cut at a tangent to the circle. Two crystal air-channels, placed below the ring of burners, serve to convey currents of air—one to the inner, the other to the outer side of the circle of flames. These air currents regulate combustion, and give steadiness to the lights. The sections of the burners have been so arranged as to afford the maximum of light for the amount of gas consumed, the flow of the gas being governed by a pressure regulator.

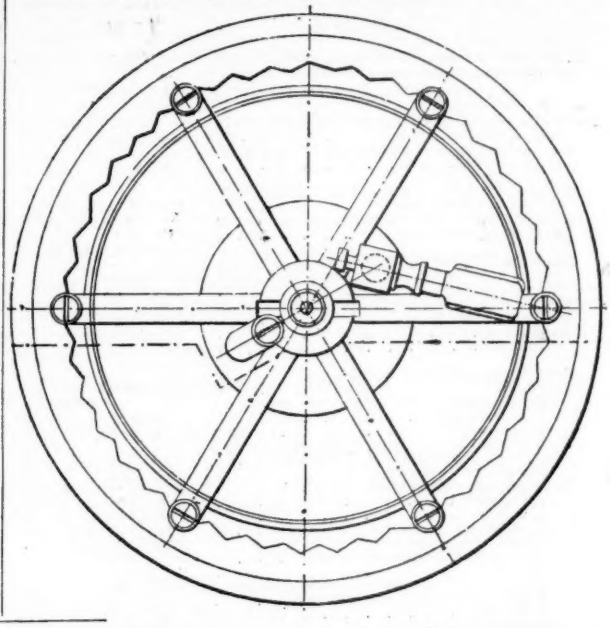


A small jet, which is kept constantly burning, enables the gas to be lighted without necessitating the opening of the lantern. There is in addition a central burner, which can be lighted from the ring of jets by the simple turning of a tap. This burner is similar to those ordinarily used in the street-lamps in Paris, and is intended to furnish the regulation supply of gas after midnight, or whenever the higher degree of illumination is not desired.

Each of the six jets of which the entire burner is composed, if taken singly, would consume about 8·23 cubic feet of gas per hour, and yield a light equal to about 16·45 sperm candles. The amount of gas consumed by the entire apparatus is rather under 50 cubic feet per hour, and the light produced is equal to about 135 candles, or at the rate of 22·5 candles for each jet. This increase in illuminating power is partly attributable to the judicious manner in which the supply of air to the burner has been arranged, and partly to the absence of the blue, non-luminous portion of the flame, enabling its light-giving power to be utilized to the fullest extent. As each new gas-light has the illuminating power of 135 candles, it is consequently of higher power than one of the electric lamps in the neighbouring Avenue de l'Opéra, which has been estimated by one of Municipal Engineers at about 116 candles.

The Rue du Quatre Septembre is a thoroughfare about 600 yards long, by about 13 yards wide, giving a superficial area of 7800 yards. To light this area the Paris Gas Company have erected 62 lanterns, each furnished with one of the new burners, yielding an aggregate quantity of light equal to 8000 candles, at the cost of about 9s. 2d. per hour, or 1·77d. per lamp, against 3d. per hour, the cost of each electric light in the Avenue de l'Opéra. The lamps are placed at the height of about 10 ft. 6 in. from the pavement.

With regard to the relative merits of gas and the electric light for the illumination of public thoroughfares, the *Journal des Usines à Gaz* says that, standing at one of the refuges in the Place de l'Opéra, the spectator may form a very fair estimate of the effect produced by the two systems of lighting. Looking along the Avenue de l'Opéra, one would suppose it to be illuminated by moonlight, if the opal globes surrounding the Jablochkoff candles were not visible, and if the rays they emitted did not every moment vary in intensity of colour. The light, too, is unequally distributed; it is intense at the foot of the lamp-pillar, and diminishes in power in proportion to its distance from the lamp, the middle of the carriage-way being worse lighted than the rest of the thoroughfare. The Rue du Quatre Septembre, on the other hand, presents to the view a magnificent illumination. The lamps standing in perfect line seem to contain bowls of gas-light; the crystal cups concealing the burners appear to be filled with flame, which burns tranquilly, and not in the flickering manner of a torch. The general effect is magnificent; but, adds the *Journal*, for ordinary street illumination such a display of light is certainly not required.



THE LANCASHIRE COAL AND IRON TRADES.

(FROM OUR OWN CORRESPONDENT.)

Although there has been a little extra push of orders for some classes of fuel, chiefly house-fire coal, owing to the pits and yards in the Manchester district having been closed last week for the holidays, business is generally very dull, and, where sellers have to go into the open market to secure orders, extremely low prices have to be taken. A fair number of gas coal contracts are now in the market, and a few have recently been settled; but, so far as can be ascertained, the prices at which these have been taken are very low, and in most cases considerably below those which sellers were able to obtain last year, whilst buyers, in many instances, have been asking for very extended deliveries. In other classes of fuel for iron-making, steam, and engine purposes, the market is very dull and slack, notwithstanding the lessened quantity of round coal now being screened is still plentiful in the market. Prices are generally so low that there is not much margin for any considerable amount of underselling; but still, where colliery proprietors are raising any large quantity of coal, and especially the lower qualities, for which they have no regular market, some extremely low figures are taken to effect sales in bulk. The average quotations at the pit mouth may be given about as under:—Best house coal, 9s. to 9s. 6d. per ton; second qualities, for house-fire and gas-making purposes, 6s. 3d. to 7s. 3d.; common round coal, for house-fire and gas, 5s. 6d. to 6s.; steam and forge coal, 4s. 6d. to 5s. 3d.; good burgy, 4s. to 4s. 3d.; and good slack, 3s. to 3s. 6d., with common sorts offering from 2s. per ton upwards.

There is a good deal of short time being worked at the pits, but I hear that the men are now raising more coal in four days than they did in five during the better times.

At one of the large collieries in the Tyldesley district there is a strike against a reduction of wages, and about 1200 men and boys are now out.

In the iron trade there has been very little doing, and the Lancashire smelters, notwithstanding that about two-thirds of the furnaces are at present out of blast, are putting a good deal into stock. For delivery into the Manchester district, Lancashire pig iron is quoted at about 45s. per ton for No. 3 foundry, and 44s. 6d. for No. 4 forge, less 2½ per cent.; but with the weakening tendency of outside brands coming into this market, local producers have to give way to secure orders, and there is a disposition to take less money when offers are made. In the finished iron trade prices are also weaker, and common bars delivered into the Manchester district are now offered at less than £5 10s. per ton, with the better sorts ranging up to £5 15s. per ton.

THE COAL AND GENERAL TRADE OF THE NORTH OF ENGLAND.

(FROM OUR OWN CORRESPONDENT.)

There was continued activity in the gas coal trade from Durham county last week. The principal demand was for best qualities. The shipments of these sorts were heavy. The demand was well sustained. It is likely to be so over June. Indeed, there are orders and contracts on hand which will keep the best gas pits going full time until then. This is not the case with the second-class collieries. Business has been falling off there. A good few second-class gas coals have been standing in the waggons. Some of the collieries would be willing to give immediate loading terms, provided merchants or gas-works had tonnage ready for loading.

Prices of best gas coals are fully supported. They are lower for second sorts. We are shipping a quantity of gas coals, to Russia, Cronstadt, and St. Petersburg especially. We have keen competitors, however, in the Germans, who, to some extent, are subsidised by the States is in the way of railway concessions. Price of best gas coals, from 6s. 3d. to 6s. 6d.; second-class coals, 5s. 7d. to 6s. per ton, less 2½. Business has fallen off at the Northumberland steam collieries. Indeed, the northern coal trade is rapidly getting back to its normal state again. The gas collieries no doubt will be fully employed some time longer. The best of them will do at full

time. Stocks have to be made up. There is no prospect of any advance in price, however. The rush is now over. The collier offices had the command of business three weeks. No doubt they would have been glad to have established a rise, but they failed to do so.

Freights are about the same. For a single or a series of voyages to London for gas coals the rate is 4s. a ton, steamers. Sailing vessels, to Plymouth, 5s. 10d.; Penzance, 6s.; Port Severn, 6s.; Poole, 5s. 9d.—small ships, all gas coals. There is a strong demand for gas coals for Holland, middling for the North of France, very quiet for the eastern counties of England, fair for Ireland.

The chemical and general business of the North of England is quiet. There is no change in prices. The lead trade is dull. Red lead is quoted £14 15s. a ton. Perhaps it could be bought at a little less. There is a fairly good demand for fire-bricks and cement.

TRADE NOTES FROM SCOTLAND.

(FROM OUR OWN CORRESPONDENT.)

The various members of the British Association of Gas Managers from this side of the Tweed who attended the meeting of that body just held in Newcastle have now returned to their respective places of abode, and are preparing to get into harness again after their week's "outing." Taken altogether, they formed a pretty strong contingent, which was but natural to expect, considering the facility with which Newcastle is reached from many parts of Scotland, and the very great amount of interest attaching to the town and its surroundings. I have been in personal intercourse with many of the members to whom I refer, and I am glad to be able to say that they have expressed themselves as being highly delighted with the meeting, and with the courtesy and cordiality with which they were received by their fellow-members. They all concur in speaking of the meeting as being the most successful and enjoyable event of the sort in which they ever took part, and they look forward with some degree of hope that an early meeting will be held in Scotland, when they may have an opportunity of reciprocating the good feeling just shown to them, and of extending hospitality to such of their professional brethren as may be induced to pay a visit to the "land of the mountain and the flood." One of the provincial meetings of the Association has already been held in Edinburgh, and it seems to be generally felt that Glasgow ought to be selected as the place for holding the meeting of 1881—London, of course, being the meeting-place next year. Speaking from a long and varied experience of Glasgow, and of many other provincial towns and cities, my opinion is that, next to London, there is no city in the kingdom having more interest for gas managers and gas engineers than the commercial and manufacturing metropolis of Scotland, and the surrounding district.

Notwithstanding the dull and depressed condition of trade and manufacturing industry during the past year, the annual make of gas at Dunfermline goes on increasing, the amount made last year being 36½ million cubic feet, as against 34 millions in the annual report for 1877. The price is 4s. 2d. per 1000 feet, or, with the graduated scale of discounts, 3s. 11d. From the statement of accounts which is about to be submitted to the Shareholders of the Gas Company, I learn that the extra expenditure last year on the works and on the extensions to Townhill amounted to about £1400. During recent years the unaccounted-for gas generally ranged from 9 to 11 per cent., but in the year just closed it has advanced to well-nigh 15 per cent.—a circumstance which may well excite anxiety in the minds of persons who are directly concerned in the success of the gas supply undertaking. The increase is believed to have been due to the great severity of the weather during the past winter, the frost acting detrimentally upon the street-mains. In having such experience, and forming such an opinion as to the cause, Mr. Mackenzie, the Manager, is not singular; in support of which I may say that some member of the North British Association of Gas Managers has promised to read a paper on the subject at the next meeting of that body, which is to be held at Edinburgh during the ensuing month. It is probable that a reduction in price will be announced at the forthcoming annual meeting of the Dunfermline Gas Company. The rule in fixing the price is to take the rates paid in five other towns—Edinburgh, Glasgow, Greenock, Paisley, and Kirkcaldy—the average being struck on the 1st of August.

With a view to save the cost of arbitration, the Town Council of Burntisland opened negotiations with the North British Railway Company for the purchase of the gas-works privately, and have succeeded in coming to terms. The town previously offered £4500, and the Company wanted £7500. The sum agreed on is £6300, but the property now includes Gas-Works Terrace—five cottages and adjoining ground—not embraced in the former valuation. The transfer takes place on the 31st of July, and the Company engage to become consumers at a percentage below the ordinary charges for seven years. This arrangement, which is thought to be mutually satisfactory, was ratified at a special meeting of the Town Council on Tuesday night.

The annual general meeting of the Stonehouse Gaslight Company was held last week, when, on the recommendation of the Directors, a dividend of 5 per cent. was declared, and it was agreed to reduce the price 10d. per 1000 cubic feet for the current year, the rate now being 6s. 8d.

On the evening of Tuesday, the 10th inst., a meeting of the Shareholders of the Milngavie Gas Company was held—Mr. William Blackwood, of Craigton, presiding. The Directors recommended a dividend of 4 per cent., which was agreed to; and they reported that additional accommodation had been found necessary, including a new coal-shed, addition to the Manager's house, with board-room, all of which had been completed at a cost of £360. There had been an increase in the consumption of gas during the past year, but the percentage of leakage was greater than in any former year.

The Largs Gaslight Company have agreed to reduce the price of gas 10d. per 1000 cubic feet, the reduction to take effect on and after the 15th of August next, being at the rate of 5s. 10d. per 1000 feet.

A dividend at the rate of 10d. per share, or about 4 per cent., has just been declared by the Dunning Gaslight Company; and the Kettle, Freuchie, and Kettlebridge Gas Company have reduced the price of gas from 7s. 6d. to 6s. 8d. per 1000 cubic feet.

There has been much activity shown this season amongst the gas companies of Scotland in placing orders for their annual supply of coal, nearly all the large towns and many of the smaller ones having already concluded their contracts for the year. It is understood that a slight reduction in price has taken place over all the different classes of cannel coal, which may be taken as a sure sign that the latest development of the dull condition of trade has at last reduced the demand for cannel, and relatively affected the prices. The Glasgow Gas Corporation Commissioners were amongst the earliest purchasers in the market this year, and it is reported that they have bought about 150,000 tons, which, with some 40,000 or 50,000 tons of last year's stock, should give them a total quantity sufficient to keep their several gas-making stations going until the end of the next financial year. The Greenock Gas Commissioners settled their contracts last week, the principal purchases being made from Tannochside and Braehead Collieries, both of which, it is said, were made at a figure much less than that paid by the Glasgow Gas Commissioners. I am informed that if they had bought those two quantities of coal as cheaply as the Greenock Gas Trust, they would have saved close upon £1500 on those two items alone.

The chief event of the past week in connection with water supply undertakings in Scotland was the formal turning on of the new Edinburgh water supply, which took place on Friday, at Gladhouse reservoir, the ceremony being performed by Lord Provost Boyd, in presence of a large gathering of spectators, including about 140 gentlemen from Edinburgh, Leith, Portobello, and Dalkeith, &c., who had been specially invited to attend.

There was a marked degree of firmness in the Glasgow pig iron warrant market at the beginning of the past week, and a good business, largely the result of a speculative movement, was done at better prices. The quotations, however, did not hold, and a smart reaction took place on Friday, when business was transacted at 41s. 9d. down to 41s. 7d. cash, buyers at the close in the afternoon offering 41s. 6½d. per ton.

The Glasgow coal market shows no alteration this week, and the demand for every description continues to be dull. Prices are without quotable change.

THE STOCKTON AND MIDDLESBROUGH WATER-WORKS PURCHASE.—At the meeting of the Middlesbrough Town Council, held last Tuesday, the Town Clerk presented three precepts from the Joint Water Board for payment of various sums of money. These he was authorized to borrow on the best possible terms. The first precept was for £1700 7s. 6d., being the moiety of the cost of stamping the conveyance of the water-works. The second was for £5090 11s. 4d., being the moiety of the expenses incurred by the Water Board in the arbitration with the Stockton and Middlesbrough Water-Works Company. The third was for £3000, being their moiety of the balance of the purchase-money due to the Company. This last item is half of the amount which, it was stated at a meeting of the Joint Board the previous day, the representatives of the Water Company have agreed to take in full settlement of all matters in dispute between the Company and the Board. The amount originally asked was £13,700.

KIBWORTH GAS COMPANY.—The annual meeting of this Company was held on Thursday, the 5th inst.—Mr. W. Grant in the chair. The Directors reported that the business of the Company was making steady progress, and the past year could not be said to be a bad one, although there had been a very serious depression of trade. The quantity of gas made was 2,224,800 feet, exceeding the quantity made the previous year by 22,100 feet, which was satisfactory. The receipts for the year were—For gas and rents of meters, £601 15s.; coke, tar, and lime, £83 7s. 1d.; street-lamps, £59 15s. 6d.; balance from last year, £322 13s. 9d.; and other small amounts make the total £1178 6s. 1d. The expenses for the past year were £842 0s. 4d., which left a balance of £336 5s. 9d. The Directors recommended a dividend of 6 per cent., which would take £240, and would leave a balance of £96 5s. 9d. to be carried forward. The report was received and adopted; the retiring Directors, Messrs. Frearson and S. Garratt, were re-elected; and a vote of thanks was passed to the Directors during the year. Mr. T. W. Hall (Market Harborough) was re-elected Auditor, and Mr. E. Cayzer, Secretary.

Register of New Patents.

APPLICATIONS FOR LETTERS PATENT.

2267.—GROUT, G., Hornsey, and SENNETT, R., Southwark, London, "An improvement in illuminating by electricity." June 9, 1879.

2289.—PRICE, E., Hampton Wick, London, "Registering the time of lamplighters and various other employés." June 10, 1879.

2291.—FRANZINI, M. M., Regent Street, London, "A new or improved gas-burner." June 10, 1879.

2301.—WERDERMANN, R., Princes Street, Surrey, "Improvements in apparatus for electric lighting." June 10, 1879.

2305.—AINSWORTH, J. C., Bury, and ROBERTS, R. K., Tottington, Lancs, "Improvements in regulating gas-taps or gas stop-taps." June 10, 1879.

2318.—WILD, R., Rochdale, Lancs, "Improvements in the manufacture of gas for illuminating and heating purposes." June 11, 1879.

2321.—ANDREWS, J. D. F., Charlton, Kent, "Improvements in apparatus for the production and regulation of electricity applied for illumination." June 11, 1879.

2322.—ABEL, C. D., Southampton Buildings, London, "Improvements in electric lamps." A communication. June 11, 1879.

2338.—CLARK, A. M., Chancery Lane, London, "Improvements in gas-burners for lighting and heating." A communication. June 12, 1879.

2339.—CLARK, A. M., Chancery Lane, London, "Improved means for obtaining light by electricity." A communication. June 12, 1879.

2340.—CLARK, A. M., Chancery Lane, London, "Improvements in electrodes used in the production of the electric light." A communication. June 12, 1879.

PATENT WHICH HAS PASSED THE GREAT SEAL.

5123.—DERING, G. E., Lockleys, Herts, "Improved means of obtaining light, heat, and motive power." Dec. 13, 1878.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

1961.—LASCELLES, C. T. E., "Improvements in gas and other explosive motive power engines." May 10, 1876.

2147.—MOHR, F. W. B., "Improvements in treating spent oxide of iron, obtained in the preparation of gas to produce colouring matters and other products." May 20, 1876.

2316.—SAXBY, F. E., "Improvements in and relating to valves for reducing or regulating the pressure in mains, pipes, and other conduits." June 1, 1876.

2360.—SCHNELL, J. F., "Improvements in lamps and burners, and in the means or apparatus employed for generating gas for the same from benzoline for illuminating purposes." June 6, 1876.

2374.—DANN, J. T., "Improvements in the construction of apparatus for lighting, extinguishing, and regulating gas-flames." June 7, 1876.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

977.—LAKE, W. R., "Improvements in apparatus to be used in combination with a gas-burner for concentrating the light of the same." April 3, 1872.

1679.—HARRISON, C. W. and A. H., "Improvements in the manufacture of gas for lighting and heating purposes, and in the apparatus employed therein." June 3, 1872.

1708.—HARRISON, C. W. and A. H., "Improvements in the manufacture of gas for lighting and heating purposes, and in the apparatus employed therein." June 5, 1872.

1720.—CHARPENTIER, P., "Improvements in apparatus for heating furnaces by gas." June 7, 1872.

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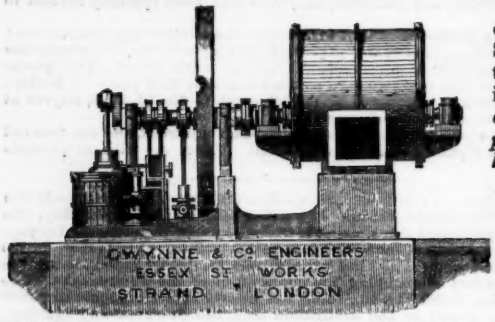

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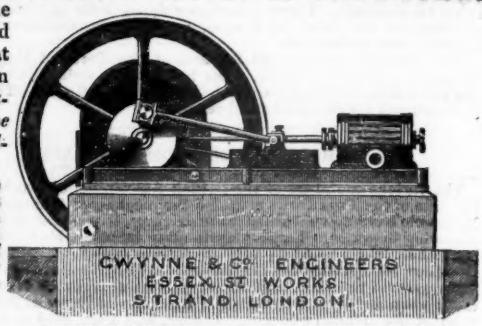

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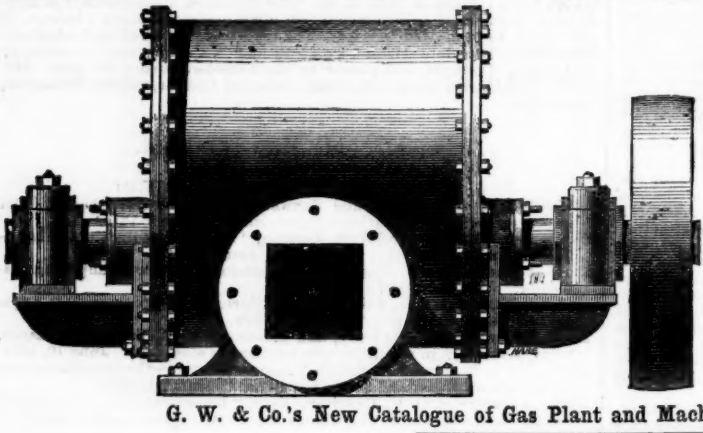

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WANTED, Readers of the NEW Edition, 1879, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, A.I.C.E., Gas-Works, SYDENHAM, S.E.

WANTED, Masonic Votes on behalf of a Child of the late Bro. John Johnson, who was a Subscribing Member of the "Evening Star Lodge," No. 1719, and a Member of the British Association of Gas Managers.

Votes received by Bro. MAGNUS OHREN, Lower Sydenham, KENT, Secretary of the Lodge.

WANTED, a thoroughly competent MAIN LAYER to take up small Pipes and lay down larger ones.

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The Meter may be seen, and further particulars obtained, on application to me, at the Gas-Works, Vauxhall, or at 70, Bankside, S.E.

C. WOODALL, Engineer.

TO BE SOLD, Cheap, Three Telescopic GASHOLDERS, two 60 ft. diameter and 20 ft. deep each lift, and one 70 ft. in diameter and 20 ft. deep. Only been in use eight years. May now be seen at work at the Effingham Street Gas-Works, Sheffield.

For price, apply to THOMAS PIGGOTT AND Co., Spring Hill, BIRMINGHAM.

GAS PLANT FOR SALE.

A 10-in. Vertical Pipe Condenser, having 20 Pipes, each 19 ft. high, on Cast-Iron Base Box.

A Scrubber, 16 ft. high 5½ ft. diameter, fitted with thin boards, Self-Acting Liquor Distributor, 10-in. inlet and outlet pipes.

Two Single-Flue Cornish Boilers (new in 1870), each 9½ ft. long, 3 ft. 9 in. diameter; Fire Tube of Low Moor Iron, complete with all Fittings.

All in good working order; removed to make room for larger plant.

For further particulars apply to THOS. TREWHITT, Gas-Works, WEST HARTLEPOOL.

May 8, 1879.

GAS-WORKS FOR SALE, situate within easy distance of extensive Collieries.

The Works, which consist of Retort-House, Seven Retorts, Purifying-House, Two Purifiers, each 5 ft. square, with Dry Centre-Valve, Meter-House, Station-Meter, and Bye-pass Valve, Lime and Store Sheds, Condensers, and Gasholder to contain about 5000 cubic feet. Manager's house and offices are in capital condition.

The average make of gas is over one million cubic feet per annum, for which 8s. per 1000 is paid, and there is a steadily increasing consumption.

For further particulars, apply by letter to H. T., 23, Paddington Green, LONDON.

THE Sunbury-on-Thames Gas Company have FOR SALE the following PLANT in good condition, thrown out to give place to larger:—

Two Purifiers, 6 ft. by 3 ft. by 3 ft. 6 in. deep.
Two do., 5 ft. by 3 ft. by 3 ft. deep.
6-in. Connections, with two Lifting Screws and Travellers complete.
Six 6-in. Cathels's Patent Four-way Valves.
Station-Meter to pass 1500 ft. per hour, 4-in. Connections.
4-in. Governor.
5-in. Pipe Condenser.
Six 6-in. Donkin's Valves.

For further particulars apply to Mr. JOHN SMITH, Manager, Gas-Works, Sunbury-on-Thames, MIDDLESEX.

THE Oxford Gas Company have for Sale the following Second-Hand PLANT:—

A 12-horse power Horizontal Engine.
A 10-horse power Horizontal Engine.
A Cornish Boiler, 18 ft. by 5 ft.
A Cornish Boiler, 18 ft. by 4 ft. 3 in.
Steam-Valves, Tubing, and Fittings complete.
Two Purifiers, 10 ft. by 10 ft. by 4 ft., with Lifting Gear complete.
Two Condensers and Two Scrubbers, with 10-in. Valves and Connections.
A 10-in. Cockey's Centre-Valve.
Several D Mouthpieces, lengths of Hydraulic Main, Ascension, H, and Dip-Pipes, and a number of various Connections and castings, which will be sold at a little over old iron price.

For further information, apply to Mr. JAMES ELDRIDGE, Jun., Gas Works, OXFORD.

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TENDERS solicited for the Purchase of a quantity of old Cast-Iron Cased Meters.

Further particulars on application at the Gas-Works, Meadow Lane.

Endorsed tenders will be received not later than Thursday next, the 19th inst., at Ten a.m., addressed to the CHAIRMAN, Gas Offices, Boar Lane, LEEDS.

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THE Shanklin Gas Company, Limited, have FOR DISPOSAL a nearly new 8-in. Air Vessel Concentric GOVERNOR, with six Ornamental Pillars, 8-in. Four-way Bye-pass Cock with Connections. Makers, Messrs. W. and B. Cowan. To be moved to make room for extensions.

Can be seen and particulars obtained on application to W. SUTHERLAND, Secretary.

GAS APPARATUS FOR SALE.

THE Dorchester Gas and Coke Company, Limited, have the following APPARATUS FOR SALE:—

Station-Meter, with Clock, 5000 feet per hour, Valves complete; 7-in. Connections.

Governor, Valves complete, and Connections; 7-in. diameter.

Box Condenser, 24 8-in. Pipes, Valves and Connections complete; 7-in. diameter.

Scrubber, 5-ft. diameter, 12-ft. high, fitted with Distributing and Flushing Apparatus; Valves and Connections complete, 8-in. diameter.

Two Gasholder-Valves, for working two gasholders, Inlet and Outlet, Cockey's patent, 10-in. Connections.

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TO MANUFACTURERS OF GAS-ENGINES, GAS COOKING STOVES, LAMPS, AND BURNERS.

THE Gas Committee for the Corporation of East Retford beg to inform the above that they will Supply GAS free of charge to EXHIBITORS at the Nottingham and Nottinghamshire Agricultural Show, to be held at Retford, July 22nd and 23rd.

A gas-main will be laid ready for all to attach service. Schedules of prizes are now ready, and may be had, post free, on application to John Barrow, Hon. Sec., 16, Market Street, Nottingham.

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THE Directors of the Cirencester Gas Company, Limited, are prepared to receive TENDERS for the Supply of 600 Tons of Real Old silkstone GAS COAL; 600 Tons of best Forest of Dean GAS COAL, and 300 Tons of through Penygraig Welsh COAL, to be delivered at Cirencester Station during the next Twelve months, in such quantities and at such times as the Gas Company's Manager may direct.

Also for the purchase of the Company's COKE, to be removed from the works by the Contractor as required by the Manager.

Tenders to be sent to J. BEECHAM, Secretary to the Gas Company, on or before the 1st of July next.

ST. MARY CHURCH LOCAL BOARD—GAS DEPARTMENT.

THE Gas Committee invite Tenders for the Supply of 1200 Tons of approved GAS COAL, to be weighed over their machine, and delivered free into the stores at the Works, in the following quantities, viz.:—250 Tons in each of the months of August, October, December, 1879, and Feb., 1880, and 200 Tons in May, 1880.

Sealed tenders, to be addressed to the Chairman of the Lighting Committee, and marked "Tender for Gas Coal," to be sent in not later than the 30th inst.

The Committee do not bind themselves to accept the lowest or any tender.

T. EVANS, Manager.

Gas-Works, St. Mary Church, Torquay.

MACCLESFIELD CORPORATION GAS-WORKS.

COAL AND CANNEL CONTRACTS.

THE Gas Committee are prepared to receive TENDERS for the Supply of the whole or part of 4000 tons of CANNEL and 9000 tons of GAS COAL. Deliveries, free at Macclesfield, to commence as follows:—The Cannel, June, 1880, extending One year, and in such quantities as may be required. The Coal, November, 1879, extending eighteen months, in such quantities as may be required.

Tenders, specifying the description of Coal or Cannel, the pits at which they are to be raised, and the terms for net monthly payments, to be sent in not later than the 21st of June, addressed to the Chairman, Gas Committee, Town Hall, Macclesfield.

The Committee do not bind themselves to accept the lowest or any tender.

THOMAS MOORE, Engineer and Manager.

May 26, 1879.

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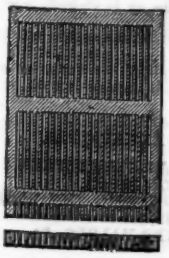

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TO COAL PROPRIETORS.

THE Directors of the Cheltenham Gas-light and Coke Company invite TENDERS for the Supply of the best quality of COAL for Making Gas, for One or Two years, from the 1st of July next.

Quantities, particulars, and conditions of Contract may be had on application.

Sealed tenders, addressed to the Engineer, must be forwarded on or before the 18th prox.

The Directors do not bind themselves to accept the lowest or any tender.

R. O. PATERSON, Engineer.

Gas-Works, Cheltenham, May 23, 1879.

STAFFORD CORPORATION GAS DEPARTMENT.

CONTRACT FOR COAL.

THE Gas Committee are desirous of receiving TENDERS for 6000 Tons of Screened GAS COAL or NUTS, for One or Two years, commencing on the 1st of July next, to be delivered free at the Gas-Works.

Sealed tenders to be addressed to the undersigned, endorsed "Tender for Coal," specifying the description of Coal and the pit where it is to be raised, on or before the 20th of June.

The Committee do not bind themselves to accept the lowest or any tender.

By order,

JNO. STORER, Manager.

Gas-Works, Stafford, June 5, 1879.

THE Directors of the Glossop Gas Company are prepared to receive TENDERS for the supply of COAL and CANNEL for a period of One, Two, or Three years, to be delivered at Glossop Station in such quantities as required, commencing September next. Probable quantities per annum:—

1000 Tons of best screened Cannel,
3000 Tons of best screened Gas Coal,
200 Tons of best screened Gas Nuts

Tenders, specifying the description of Coal and Cannel, the pits at which they are raised, price per ton of 20 cwt., to be sent in not later than the 28th inst.

The Directors do not bind themselves to accept the lowest or any tender.

By order of the Board,

JAMES DALGLIESH, Manager, &c.

Gas-Works, Glossop, June 10, 1879.

BURTON-ON-TRENT CORPORATION GAS-WORKS.

THE Gas Committee are prepared to receive TENDERS for the Surplus TAR produced at their Works for One year, delivered into Contractor's Railway Tank Trucks, on the Gas-Works railway siding.

Payments to be made monthly, net cash.

The surplus quantity is estimated at 600 tons, but the same cannot be guaranteed, as it may be more or less.

Further particulars may be had on application to the undersigned.

Sealed tenders, to be addressed to the Chairman, and endorsed "Tender for Tar," to be sent in not later than the 28th day of June.

The Gas Committee do not bind themselves to accept the highest or any tender.

JOHN MUDIE, Engineer.

Gas-Works, Wetmore Road, June 13, 1879.

TENDERS FOR COALS.

THE Directors of the Dorking Gas Company are prepared to receive TENDERS for the Supply of about 1500 Tons (or such other quantity as may be required) of New Pelton, Pelaw Main, Penrith, or other approved GAS COAL, to be delivered free at the Dorking Station of the South-Eastern Railway.

Payment, by cash, two months from date of delivery, which can be arranged by application after the first delivery of 100 Tons, which must be on the Company's Works on or before July 12 next.

Tenders to be addressed to the undersigned by June 30 next.

The Directors do not pledge themselves to accept the lowest or any tender.

WALTER PHILPS, Secretary and Manager.

Gas-Works, Dorking, June 10, 1879.

TO COLLIERY OWNERS.

THE Corporation of the Borough of Dewsbury hereby invite TENDERS for the Supply and Delivery of the following quantities of the best GAS COAL and CANNEL:—

12,000 Tons Gas Coal.
1,000 Tons Cannel.

The Coal to be well screened and dressed, free from scales, sulphurous pyrites, or other objectionable matter. Deliveries to be made in such quantities and at such times as the Manager may direct, from July 1, 1879, to June 30, 1880. The Coal to be delivered at the Savile Town Works, or (if sent by boat) to be delivered into boxes ready for hoisting by the steam crane.

The Corporation do not bind themselves to accept the lowest or any tender.

The Contractor to state in the tender the seam and the pit from which he intends to send the Coal.

Sealed tenders, endorsed "Tender for Coal," to be sent to Jesse Smith, Esq., Town Clerk, Dewsbury, not later than Noon of Wednesday, the 25th of June.

Further particulars and forms of tender may be had on application to the undersigned.

C. ARMITAGE, Engineer and Manager.

Gas-Works, Savile Town, Dewsbury.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

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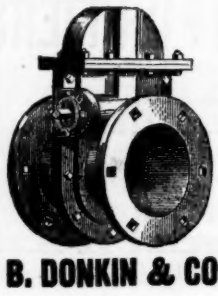

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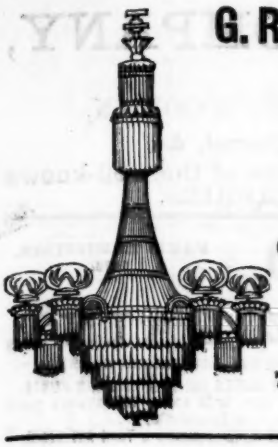

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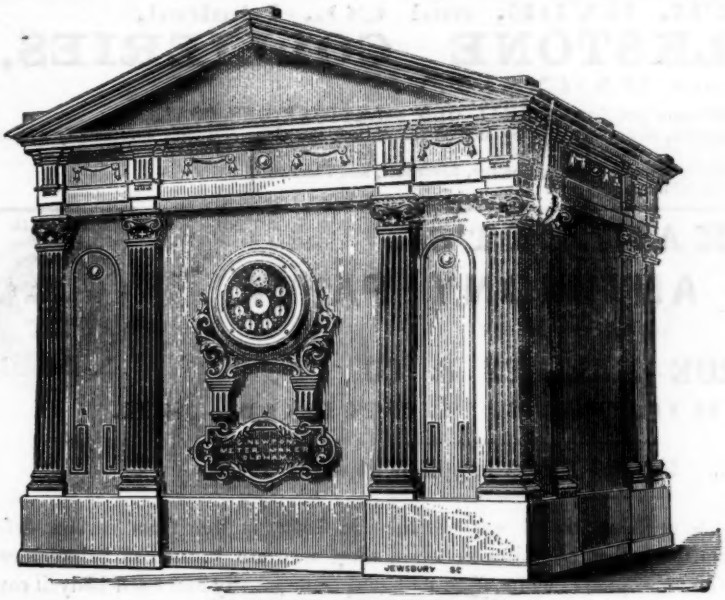

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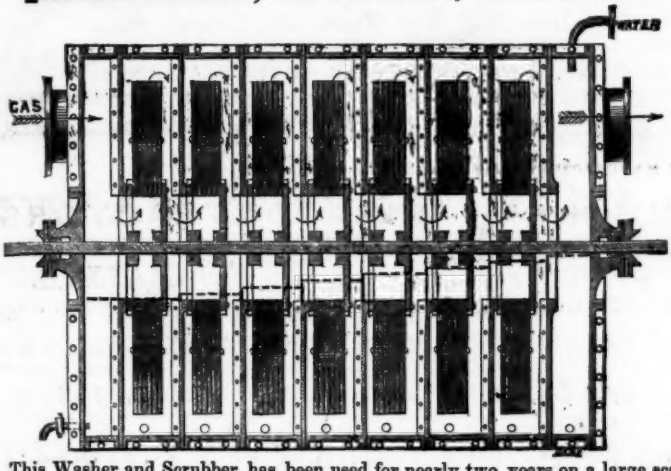
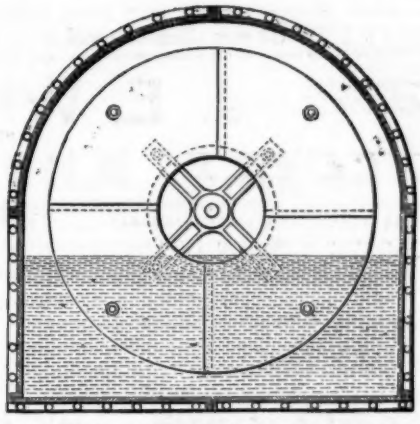
[KIRKHAM, HULETT, AND CHANDLER'S PATENT.]





This Washer and Scrubber has been used for nearly two years on a large scale at the Works of The Gaslight and Coke Company, Bromley-by-Bow, at which station there are now several in operation and in course of construction. There is also one in use at the Pancras Station, King's Cross, of the same Company, which is purifying 1,500,000 cubic feet of gas per day. At the Gas-Works of the Corporation of Leeds, a large one has been erected, which is giving complete satisfaction. The Special Merits of this Washer are as follows:—

That it is a very effective Condenser, so that it is not absolutely necessary to reduce the temperature of the gas to 60°, or thereabouts, to make the Washer effective. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

D. HULETT, Esq. *The Gaslight and Coke Company, Bromley-by-Bow, May* 3, 1877.

Dear Sir,—In answer to your inquiries respecting the results of the working of your Patent Washer, I beg to state that I find it a very efficient machine. I have had it in operation for some time, and passed gas through it continuously at the rate of 100,000 cubic feet per hour, and obtained from it 11 gallons of 10 oz. liquor per ton of coal carbonized—results which appear to me very satisfactory for so small a Washer. It works very smoothly, taking but little power, and giving no pressure. I have it still in operation, and am perfectly satisfied with its working.

I am, dear Sir, yours truly, (Signed) W. B. WRIGHT.

MESSRS. KIRKHAM, HULETT, and CHANDLER. *The Leeds Corporation Gas-Works, York Street, Leeds, Dec.* 6, 1878.

Gentlemen,—The Scrubber-Washer erected by you at these works, and which has been in use for six months, has proved to be, so far as we have been able to test it, thoroughly efficient. We are at present making 32,000 feet of gas per hour, and are entirely dependent on this apparatus for the removal of Ammonia, and the **Gas is perfectly free from that impurity in the sixth chamber,** so that four chambers remain to deal with an increasing make of gas. Owing to insufficient condensers, the gas was in the summer admitted to the Scrubber at a temperature of 70°, but was reduced therein to 61°, or that of the atmosphere. The volutes are driven at the rate of four revolutions per minute, and, working at that speed, there is not the slightest difference between the inlet and the outlet pressure. Clean water supplied at the rate of 10 gallons per ton of coal carbonized is converted into liquor of from 10 oz. to 13 oz. strength **in once traversing the vessel.** The apparatus is extremely simple and compact, occupies but little space, and requires no foundation. I shall be surprised if it does not eventually become extremely popular.

I am, Gentlemen, yours faithfully, (Signed) HENRY WOODALL, Engineer.

MESSRS. KIRKHAM, HULETT, and CHANDLER. *The Gaslight and Coke Company, York Road, King's Cross, Jan.* 14, 1879.

Gentlemen,—In reply to your inquiry, I am pleased to say, the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, **it takes out every particle of Ammonia,** while purifying more Gas than it was intended to do. I enclose particulars of a fortnight's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c. (Signed) JOHN CLARK.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 *feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—*

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 1	8½	6¾	5	3½	2½	1½	¾	½	0	0	10 Gallons.	52,000	Nil.	77°	73°	48°	24	23	7½
,, 2	8¾	7	6	4½	3½	2¼	1½	¾	½	0	10 ,,	57,000	Nil.	73°	66°	32°	21¾	20½	4
,, 3	9½	8	6	3¾	3	2¼	1½	¾	½	0	10 ,,	60,000	Nil.	75°	68°	40°	23½	22	4
,, 4	9½	7¾	6¼	4¼	3¼	2¼	1½	¾	¼	0	10 ,,	65,000	Nil.	74°	68°	33°	24	22½	5
,, 5	9½	7	6	4	3	2¾	1½	1	½	0	10 ,,	34,000	Nil.	77°	68°	35°	14½	14	5
,, 6	9¾	7½	6½	4¼	3	2¼	1½	1	¼	0	10 ,,	63,000	Nil.	72°	66°	27°	24	22½	4½
,, 7	11	9	7	5½	3¾	3	1½	1¼	½	0	10 ,,	59,000	Nil.	74°	66°	31°	25	23½	5
,, 8	9½	7½	6	4½	3	2	1	¼	¼	0	10 ,,	78,000	Nil.	73°	61°	31°	28	26½	4½
,, 9	11	9	7	5	3¾	2¾	1½	1	½	0	10 ,,	82,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10¾	8½	6¾	5	3½	2¾	1½	1	½	0	10 ,,	66,000	Nil.	76°	64°	28°	28	27	5
,, 11	12½	10	7¾	5¾	4¼	3¾	1¾	1¼	½	0	10 ,,	61,000	Nil.	73°	64°	27°	26½	25¼	5
,, 12	11	8¾	6¾	—	—	—	1¼	¾	¼	0	10 ,,	39,000	Nil.	74°	64°	27°	26¼	25½	5
,, 13	13	10¾	8¼	6	4¾	3½	2	1¼	½	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

MESSRS. KIRKHAM, HULETT, and CHANDLER. *Corporation of Birmingham, Gas Department, Saltley Works, May* 23, 1879.

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from KIRKHAM, HULETT, *and* CHANDLER'S *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March* 6, 1879.

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.									Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				—	—	—	—	—	—	—	—	—	
64,000	Inlet	2·00	2·00	158·8	72	57	21	4¾	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1
	Outlet	1·50	1·50	0·8	68	57	20		Acid, ounces.	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—
																			63

WASHER-SCRUBBERS OF THIS PATENT ARE IN COURSE OF CONSTRUCTION FOR BECKTON, BRADFORD, GREENWICH, WOOLWICH, AND SEVERAL OTHER GAS-WORKS.

For further particulars and testimonials, address

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Public Accountant,
MOORGATE STREET CHAMBERS,
GREAT SWAN ALLEY,
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CONSULTING GAS ENGINEER,
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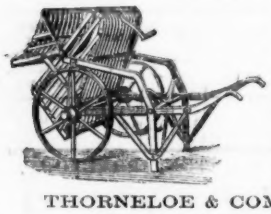

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FOR
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". . . . A blaze of light is thrown out, which, in point of efficiency and brilliancy, far surpasses the large gas-lamps lately erected in Waterloo Place, *while even the electric lights are quite thrown into the shade.*"
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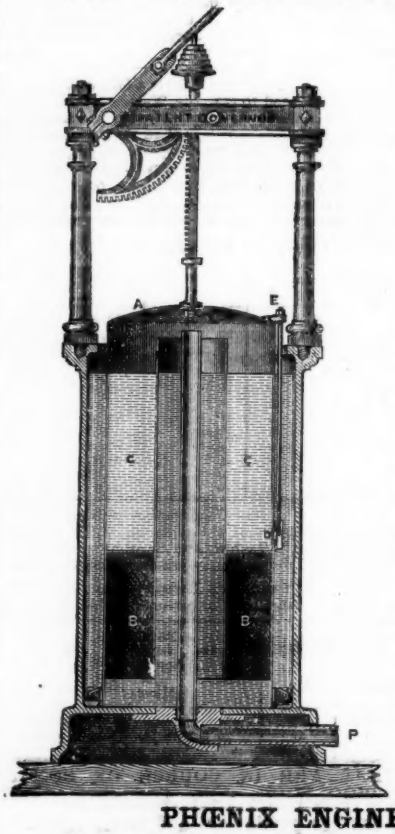
GEORGE WALLER & CO.,
GAS AND HYDRAULIC ENGINEERS,
Patent Compensating Steam Governor,
WITH SELF-CONTAINED WATER-BALANCE.



DESCRIPTION OF THE APPARATUS.
The illustration represents a section of the Patent Governor. The lower part of the Bell A is fitted with a loose Float B, and in the upper part of the Bell is a deep annular Water Chamber C, at the bottom of which is an opening D, with a slide outside regulated by a Screw Spindle E, to allow the water to pass in and out of the Chamber C quickly or slowly, according to circumstances, but when once adjusted the slide does **not require altering.** This Self-compensating Chamber gives great steadiness to the up and down movement of the Bell and effectively prevents the "hunting" motion so common with other Governors, thereby ensuring a more perfect action on the throttle-valve of the Engine **than attained by any other.** The sketch shows the clip lever fixed to work on throttle-valve at an angle, and can work in either direction. P is the Gas Inlet-pipe to Governor.

G. W. & Co. also make **special Steam Throttle Valves,** suitable for working with this Governor, and alter existing Throttle Valves to same plan.

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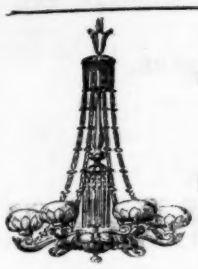

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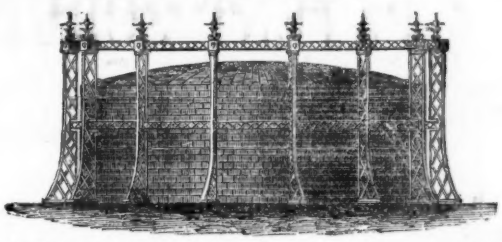

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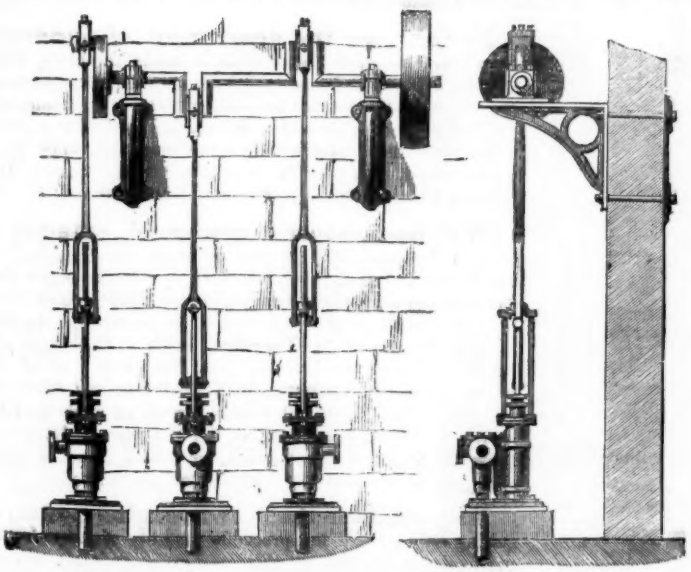

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Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers, joints faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

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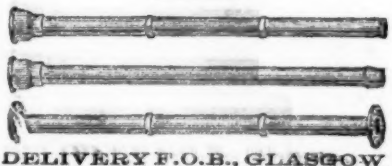

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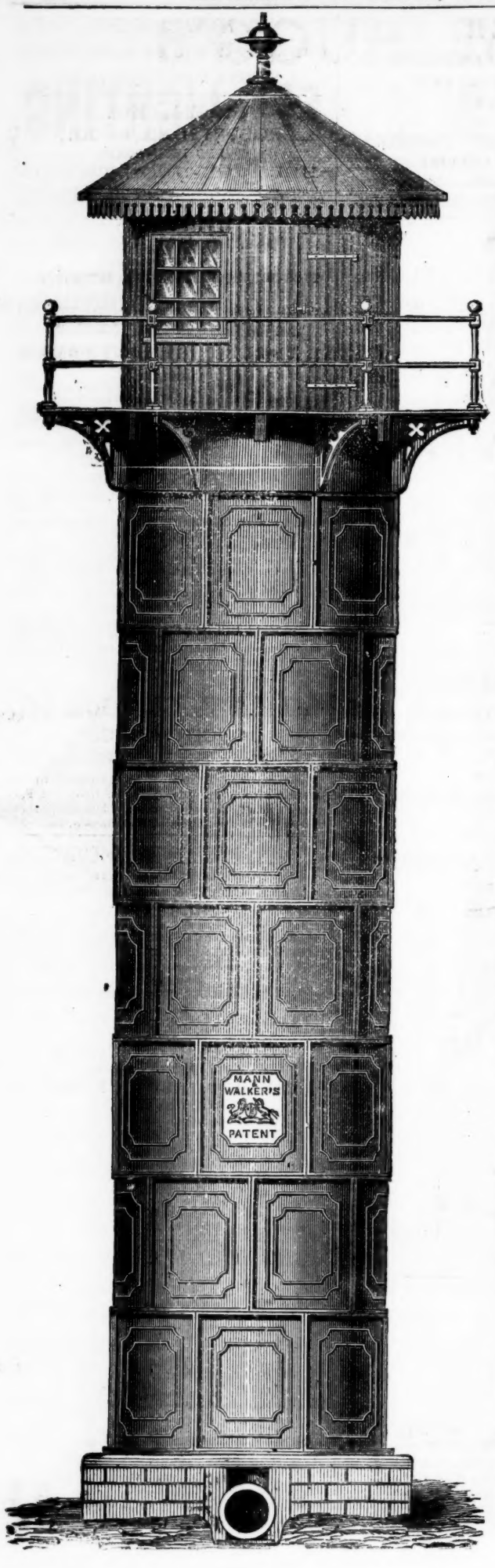

C. & W. WALKER,
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MANN & WALKERS' PATENT SCRUBBER.

By Letters Patent in Great Britain, Europe, and the United States of America.

By some important improvements recently patented, the purifying power of these Scrubbers has been much increased, and a stronger ammoniacal solution obtained, which is found to absorb a large portion of the carbonic acid contained in gas, effecting an important saving in money and labour in the lime purifiers, and where oxide only is used, the increase in the illuminating power of the gas obtained by these Scrubbers is shown in a remarkable degree, in consequence of the large quantity of carbonic acid removed from the gas.

It is to be particularly noted that the im- portant results of these Scrubbers do not depend upon the machinery alone. The entire internal construction of the Scrubber bears an almost equally important part. For this reason, where it is desirable to convert existing Scrubbers, whose dimensions happen to be suitable, the work commences by ripping out the whole of the interior of the shell, and beginning the internal construction *de novo* from bottom to top.

Fifty million cubic feet of gas per 24 hours are purified from ammonia by these Patent Scrubbers in a winter's day in the gas-works of London, where the purity of gas supply is the highest in the world, under the chemical restrictions of the Board of Trade.

Generally, wherever a high standard of purification is maintained in the chief cities and towns of the British Provinces and of Europe, these Scrubbers have become established.

By their use the department of purification from ammonia upon a gas-works is made complete, without the aid of prepared oxide of iron, chemicals in purifiers, or any other supplementary process, and the whole ammoniacal residual product contained in the coal is absorbed and obtained in the form most profitable to a gas company, while the requirements of all Acts of Parliament and of the Board of Trade, relating to incorporate gas companies, are satisfied.

Foul Gas, properly condensed, entering the inlet is, by once only passing through the Scrubber, completely purified from ammonia with regular certainty day by day, without any further trouble, or any other process, effected by a very small quantity of clear water let into the machinery room at the top of the Scrubber, which is discharged at the liquor outlet at the bottom, from Newcastle coal at about 18 to 20 ounces strength, from Yorkshire and other coals generally from 25 to 30 ounces strength; while acidulated litmus or turmeric exposed at the Scrubber outlet will not show the slightest discoloration, and there is not a quarter of a grain of ammonia per 100 feet left unabsorbed.

They contain their own engine power, requiring only a small inappreciable quantity of steam from the gas-works boiler, and are then complete in themselves, ready for service.

Applications relating to dimensions and prices should be addressed to us, C. AND W. WALKER, 8, FINSBURY CIRCUS, LONDON, E.C., or to Mr. WILLIAM MANN, late Superintendent of the Chartered Gas-Works, BLACKFRIARS, LONDON; they should state approximately the largest make of gas in 24 hours on a winter's day, and the smallest make on a summer's day, to be purified.

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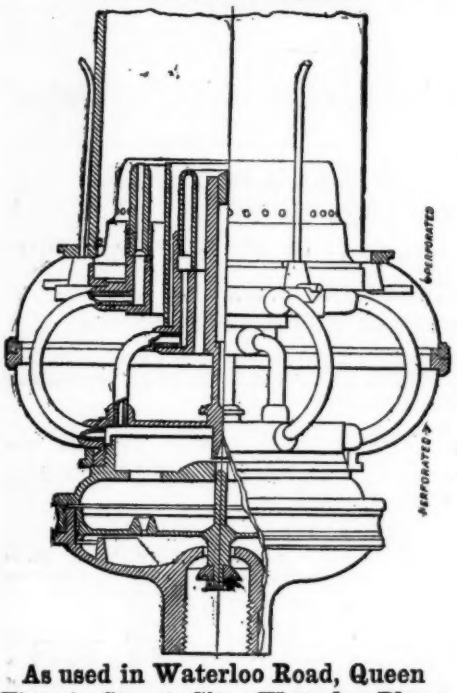
IMPROVED SYSTEM OF STREET LIGHTING,

SUITABLE FOR EITHER CANNEL OR COMMON GAS.

SECTIONAL ELEVATION of 80-candle Burner

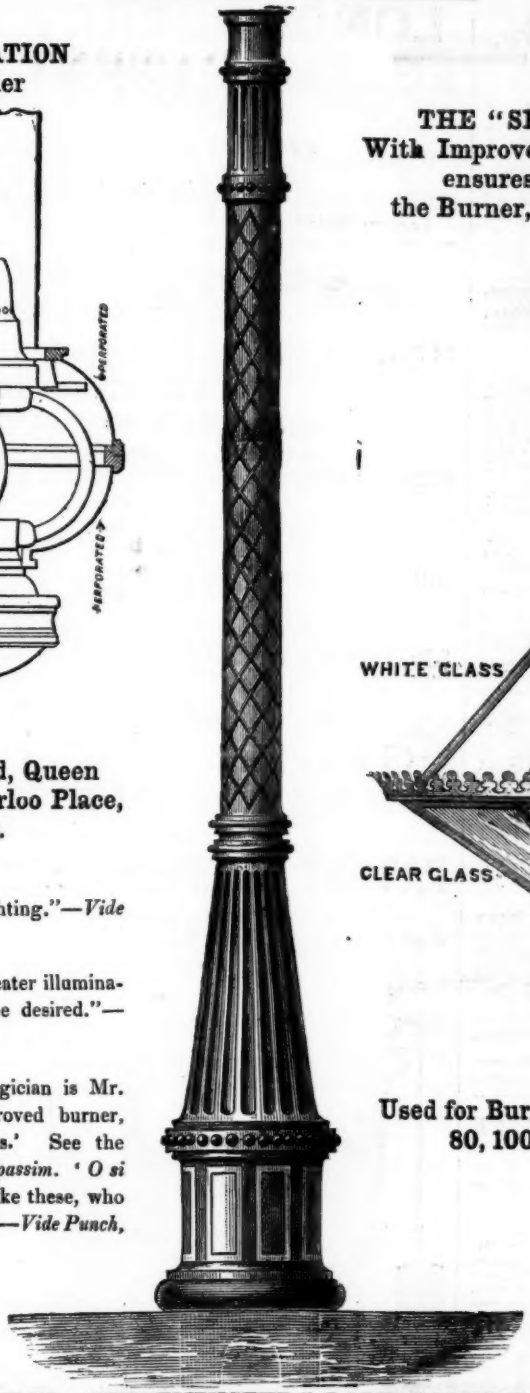


As used in Waterloo Road, Queen Victoria Street, City, Waterloo Place, and Regent Street.

"The perfection of street gas lighting."—*Vide* "*Times*," *Feb.* 1, 1879.

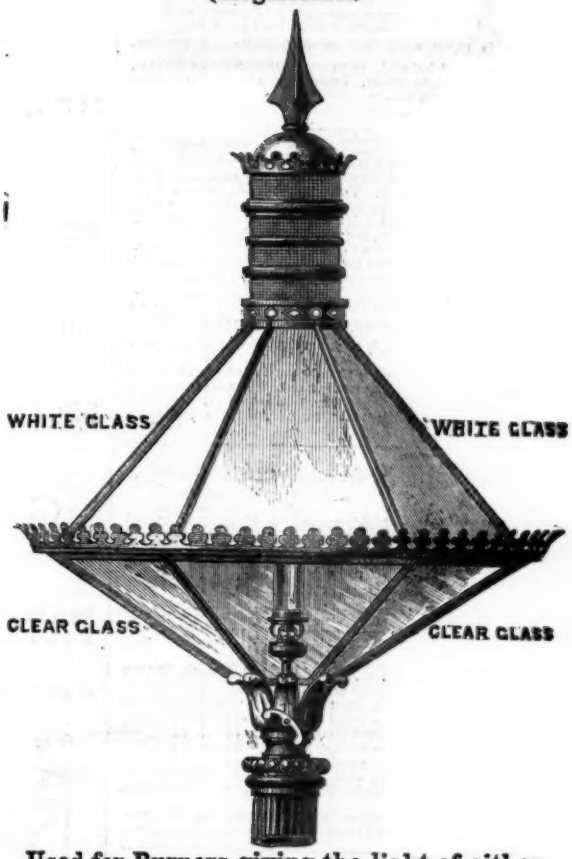
"For all practical purposes no greater illumination than is hereby supplied could be desired."—*Vide* "*Daily News*," *Jan.* 13, 1879.

"The real modern Aladdin's magician is Mr. Sugg, who, by means of his improved burner, gives us 'new lamps for old ones.' See the Waterloo Road and Waterloo Place *passim*. '*O si sic omnia!*' If all gas light were like these, who would ask for Edison and electricity?"—*Vide Punch*, *Feb.* 15, 1879.



THE "WESTMINSTER" LAMP-COLUMN,
Of Improved construction,
8 feet and 9 feet from ground to top of Column.

THE "SHADOWLESS" LANTERN,
With Improved System of Ventilation, which ensures steadiness of the flame of the Burner, even in very windy weather.
(Registered.)



Used for Burners giving the light of either 80, 100, 150, or 200 Spermaceti Candles.

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Yields 14,920 cubic feet of 40·92-candle gas per ton.

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12,530 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

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Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

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Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

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THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analyzed by Mr. James Paterson, of Warrington, yields 12,600 *cubic feet of* 16·67 *candle gas, with* 1430 *lbs. of good Coke, per ton.* Ash in Coke, 1·88.

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A large purchaser reports the coke to be clear, of a quality rarely equalled in the retort-furnace, and much liked by the stokers.

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This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

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POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over* 10,000 *cubic feet of gas, with an illuminating power of* 16 *candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17½ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

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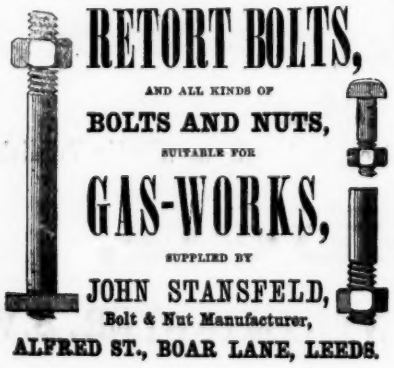

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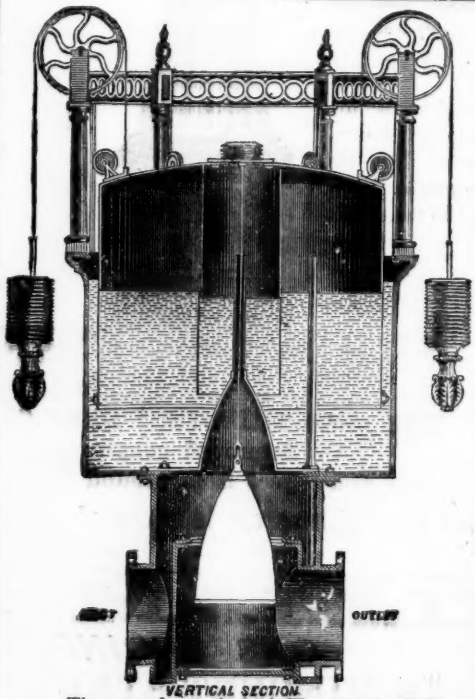
PATENT COMPENSATING GAS GOVERNOR,

Which is designed to give an uniform pressure at the Outlet to the Main at all draughts up to the full quantities which the Governors are made to control, such outlet pressure being less than the initial pressure.



VERTICAL SECTION.

The uniformity of pressure is obtained by introducing a compensating chamber into the Bell or Holder of the Governor, which compensator is of the same area as the valve, both of which are operated on by the initial pressure, thereby placing the valve in equilibrium, no matter what the initial pressure may be. The action on the Bell is by the Gas passing along a pipe from the outlet, and the pressure is regulated by weights in connexion with the Bell as required.

From the sectional elevation attached hereto, it will be seen that only the Gas required to operate the Bell comes in contact with the water of the tank, which water will remain comparatively sweet and free from odour. That in case of accident to the Bell, no more Gas can escape than would pass up the pipe covering the valve-rod and Bell supply-pipe.

These Governors have been made and sent out of various sizes for from 2 to 24-inch Mains, and give most satisfactory results.

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The above Company are raising nearly a thousand tons of the Real Old Silkstone Gas Coal per working day.

PRICES QUOTED TO ANY RAILWAY STATION, OR F.O.B. HULL, GRIMSBY, GOOLE, KEADBY, LIVERPOOL, AND FLEETWOOD.

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PARIS EXHIBITION,
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HONOURABLE MENTION
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SILVER MEDAL
FOR THEIR
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Being the Highest Honour given for this class.

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"MESSRS. NEWTON, CHAMBERS, AND CO.,

"GENTLEMEN,—After carefully testing the various samples of Gas Coals sent from your Collieries for analysis, I have pleasure in reporting them as belonging to the highest class of Gas and Coking Coals.

"The average of Nine samples gives a yield of **12,500** cubic feet of **15½**-Candle Gas, being equivalent to **664** lbs. of sperm per ton, and **1420** lbs. of fixed carbon of a very superior quality. All the samples bear a close relation to each other in value.

"Yours truly, "JAMES PATERSON."

Full particulars will be sent on application to us—address as above.

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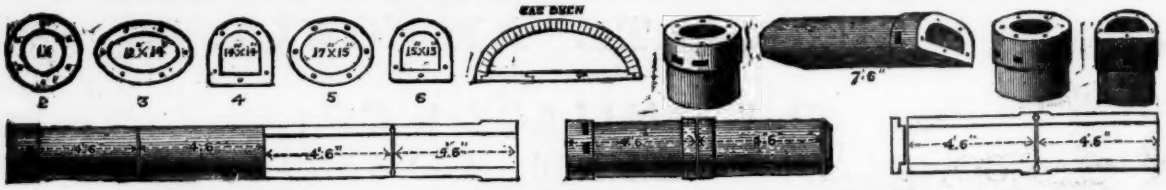

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Constructed on the principle of the ordinary Plug-Cock.

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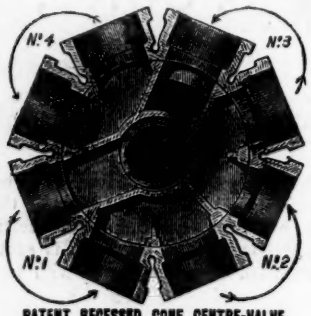

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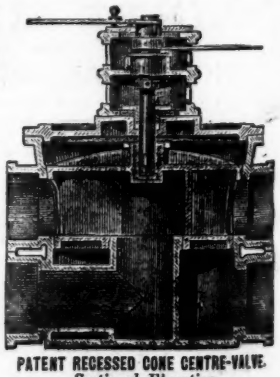
Sectional Plan.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